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ABSTRACT

During 1970-71, the Select Subcommittee on Education of the House Committee on Education and Labor held 8 days of hearings on the establishment of the National Institute of Education. This document is the third of three appendixes on the hearings and contains essays by scholars who have studied the aims of education, the issues of educational research, and ways of improving methods of teaching. Subjects include trends in education, implications of a changing society for schools, education and superindustrialism, knowledge of the future, future problems and alternatives, planning, factors affecting the future demand for education, the supply and demand for graduates of higher education, television and childhood education, implications of computer-based systems on education, teaching children to think, the potential contribution of computers to instruction reform, information science, a call for reexamination of methodology, educational insurance, performance contracting, independent study and credit by examination, a lottery system for college entrance, the need to create a more relevant educational system and a 936-item annotated bibliography of alternative futures for learning. A list of contributing authors is included. (Related documents SP 005 695 and SP 005 696 contain appendixes 1 and 2.) (MJM)

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92d Congress
2d Session

COMMITTEE PRINT

ALTERNATIVE FUTURES IN AMERICAN EDUCATION

APPENDIX 3 TO HEARINGS ON H.R. 3606 AND RELATED BILLS TO CREATE A NATIONAL INSTITUTE OF EDUCATION BEFORE THE SELECT SUBCOMMITTEE ON EDUCATION

COMMITTEE ON EDUCATION AND LABOR
HOUSE OF REPRESENTATIVES

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EDUCATION & WELFARE
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CARL D. PERKINS, *Chairman*

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ALTERNATIVE FUTURES IN AMERICAN EDUCATION

THE BASIC, LONG-TERM MULTIFOLD TREND IN EDUCATION

BY MICHAEL D. MARIEN

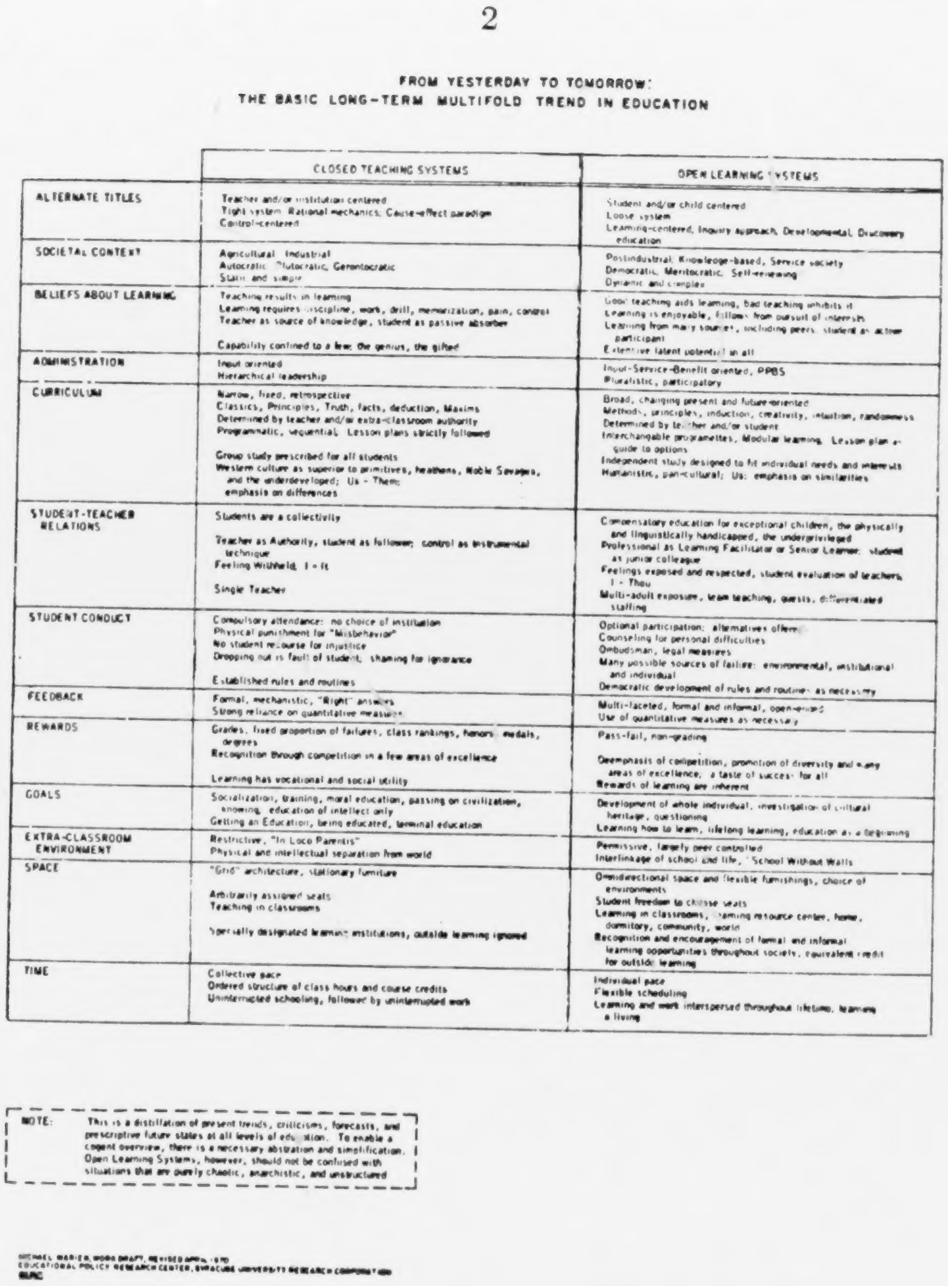
One of the most widely known and respected volumes in the contemporary futures literature is "The Year 2000," by Herman Kahn and Anthony J. Wiener. The central concept within this volume is the Basic, Long-Term Multifold Trend, which, somewhat condensed, involves:

increasingly sensate cultures (empirical, secular, humanistic, hedonistic);
bourgeois, meritocratic elites; literacy and education;
institutionalization of change and increasing tempo of change;
population growth, urbanization, and megalopolitanization; and
worldwide industrialization and modernization.

The Basic, Long-Term Multifold Trend (BLTMT) provides a general sense of societal direction, and dips into somewhat greater complexity with 8 Canonical Variations in 3 major categories, each a major alternative to the Standard World.

The major orientation of The Year 2000, however, concerns international relations, and little or nothing is said about knowledge communication, education, and internal conflict. Although international conflict is surely a critical concern, it is perhaps equally important to consider the nature of education and learning, which will be a—if not the—central concern of a complex, dynamic, superindustrial, and knowledge-based society. Indeed, the future configuration of "who learns what and how" may well determine the manner in which international problems are responded to, and could mean the difference between a viable planetary society or global cataclysm.

The chart on the following page is an initial attempt to outline a BLTMT for education, conceived here as a trend from closed teaching systems to open learning systems. It is a distillation of empirical trends, criticisms from all quarters, forecasts, and prescriptive future states at all levels of education—an overview of the transformation of homogeneous institutions for inculcating the values of an industrial and linear society, to a widely varied set of institutions that will encourage lifelong learning in a postindustrial society.



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FROM YESTERDAY TO TOMORROW:
THE BASIC LONG-TERM MULTIFOLD TREND IN EDUCATION

	CLOSED TEACHING SYSTEMS	OPEN LEARNING SYSTEMS
ALTERNATE TITLES	Teacher and/or institution centered Tight system Rational mechanics; Cause-effect paradigm Control-centered	Student and/or child centered Loose system Learning-centered, Inquiry approach, Developmental, Discovery education
SOCIETAL CONTEXT	Agricultural Industrial Autocratic Plutocratic, Gerontocratic Static and simple	Postindustrial, Knowledge-based, Service society Democratic, Meritocratic, Self-renewing Dynamic and complex
BELIEFS ABOUT LEARNING	Teaching results in learning Learning requires discipline, work, drill, memorization, pain, control Teacher as source of knowledge, student as passive absorber Capability confined to a few; the genius, the gifted	Good teaching aids learning, bad teaching inhibits it Learning is enjoyable, follows from pursuit of interests Learning from many sources, including peers; student as active participant Extensive latent potential in all
ADMINISTRATION	Input oriented Hierarchical leadership	Input-Service-Benefit oriented, PPBS Pluralistic, participatory
CURRICULUM	Narrow, fixed, retrospective Classics, Principles, Truth, facts, deduction, Maxims Determined by teacher and/or extra-classroom authority Programmatic, sequential; Lesson plans strictly followed Group study prescribed for all students Western culture as superior to primitives, heathens, Noble Savages, and the underdeveloped; Us - Them; emphasis on differences	Broad, changing present and future-oriented Methods, principles, induction, creativity, intuition, randomness Determined by teacher and/or student Interchangable programettes, Modular learning; Lesson plan as guide to options Independent study designed to fit individual needs and interests Humanistic, pan-cultural; Us: emphasis on similarities
STUDENT-TEACHER RELATIONS	Students are a collectivity Teacher as Authority, student as follower; control as instrumental technique Feeling Withheld; I - It Single Teacher	Compensatory education for exceptional children, the physically and linguistically handicapped, the underprivileged Professional as Learning Facilitator or Senior Learner; student as junior colleague Feelings exposed and respected, student evaluation of teachers, I - Thou Multi-adult exposure, team teaching, guests, differentiated staffing
STUDENT CONDUCT	Compulsory attendance: no choice of institution Physical punishment for "Misbehavior" No student recourse for injustice Dropping out is fault of student; shaming for ignorance Established rules and routines	Optional participation: alternatives offered Counseling for personal difficulties Ombudsman, legal measures Many possible sources of failure: environmental, institutional and individual Democratic development of rules and routines as necessary
FEEDBACK	Formal, mechanistic, "Right" answers Strong reliance on quantitative measures	Multi-faceted, formal and informal, open-ended Use of quantitative measures as necessary
REWARDS	Grades, fixed proportion of failures, class rankings, honors, medals, degrees Recognition through competition in a few areas of excellence Learning has vocational and social utility	Pass-fail, non-grading Deemphasis of competition, promotion of diversity and many areas of excellence; a taste of success for all Rewards of learning are inherent
GOALS	Socialization, training, moral education, passing on civilization, knowing; education of intellect only Getting an Education, being educated, terminal education	Development of whole individual, investigation of cultural heritage, questioning Learning how to learn, lifelong learning, education as a beginning
EXTRA-CLASSROOM ENVIRONMENT	Restrictive, "In Loco Parentis" Physical and intellectual separation from world	Permissive, largely peer controlled Interlinkage of school and life, "School Without Walls"
SPACE	"Grid" architecture, stationary furniture Arbitrarily assigned seats Teaching in classrooms Specially designated learning institutions, outside learning ignored	Omnidirectional space and flexible furnishings, choice of environments Student freedom to choose seats Learning in classrooms, learning resource center, home, dormitory, community, world Recognition and encouragement of formal and informal learning opportunities throughout society, equivalent credit for outside learning
TIME	Collective pace Ordered structure of class hours and course credits Uninterrupted schooling, followed by uninterrupted work	Individual pace Flexible scheduling Learning and work interspersed throughout lifetime, learning a living

NOTE: This is a distillation of present trends, criticisms, forecasts, and prescriptive future states at all levels of education. To enable a cogent overview, there is a necessary abstration and simplification. Open Learning Systems, however, should not be confused with situations that are purely chaotic, anarchistic, and unstructured

MICHAEL MARIEN, WORK DRAFT, REVISED APRIL 1970
EDUCATIONAL POLICY RESEARCH CENTER, SYRACUSE UNIVERSITY RESEARCH CORPORATION
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There are many reasons for this long-range shift, among which the following are suggested:

The growing quantity and complexity of knowledge and ignorance;

The growing demands for a skilled labor force and a sophiscated citizenry, increasingly raising the minimum level of functional literary;

Social and technological change, increasingly requiring lifelong learning and unlearning;

Leisure, affluence, and increasing access to social position through educational attainment—all increasing the demand for educational services;

Mounting evidence that all people have a far greater capacity to learn than has been admitted; and

Obsolescent institutions requiring personnel retraining.

There is a widespread sense of ferment and change, all in the direction of open learning systems, but it is difficult to determine the degree of change and where it has occurred. Uncertainty is compounded by glowing proclamations of what has happened, in the mid of bitter attacks on "the monolithic system," or of what has not happened. Do the reforms, innovations, and experiments reflect a visible minority of schools and colleges, or are they but the tip of an iceberg of change? Are the changes widespread and permanent, or are they superficial and temporary? Finally, are the actual changes keeping peace with or outpacing the growing desires and need for change?

THREE SCENARIOS

A rough sketch of what is happening and why has been outlined. The major question for the future is the rate of transition and the extent to which open learning systems become a reality for all. (A parallel shift, also of uncertain dimensions, might be noted in the goals and activities of prisons and mental hospitals, from a custodial orientation to a treatment orientation.) However, no matter which outcome obtains nonadaptation, differential adaptation, or full adaptation—an aggravation of some present social problem appears likely.

a. Nonadaptation and conflict.—The first scenario to consider is that open learning systems will not be widespread, and that the changes taking place are superficial, isolated, and short-lived. Although there is no evidence that open learning systems are more expensive than traditional systems, a period of severe financial famine at all levels of education (likely at least in the shortrun) may inhibit the thoroughgoing changes that are required. Change is not necessarily expensive, especially considering social cost savings. But it may be 20 years before public decision-makers begin to think intelligently about social costs.

The general consequence of nonadaptation would be an additional impetus to create alternatives outside of the regular educating system that would compete with and possibly replace existing forms of education. At the grade school level one can already see the rise of privately operated "discovery centers," outside learning contractors, and free schools. At the high school and college level, student-run free schools and experimental colleges are being developed as alternatives. At the same time, frustration and conflict can be expected to rise in the schools and colleges, as students increasingly develop the view that education should promote learning skills, rather than hand out obsolescing facts and shallow platitudes.

b. Differential adaptation and equality of opportunity.—Although there is a general trend toward a national system of education, there is still considerable variation among States and within States, as well as a lack of coordination between levels of education. Consequently, although the national system may be moving toward some condition approximated as open learning systems, differential adaptation can be expected both in the horizontal dimension (between and within States) and in the vertical dimension (between levels).

Trend data are not only lacking on a national aggregate basis, but also within States and metropolitan areas. In the absence of such data, the location of change can only be surmised. At lower levels, one might expect to find open learning systems in affluent and suburban school districts in the Northeast and the West, reflecting the cosmopolitan upper-middle class constituencies that are disposed to change and learning. Conversely, closed-system traits are most apt to be found in bureaucracy-ridden inner cities, isolated rural areas, the small towns of middle America, and the South—although islands of experimentation (especially in big city ghettos) may prove exceptions to this rule.

At higher levels, open-system conditions, which largely characterize the small, high-quality liberal arts college, may increasingly be found in the large national universities that attract the brightest and most vocal students. Conversely, closed-system conditions will continue at fundamentalist bible colleges and obscure State colleges.

If access to open-learning systems is considered to be desirable, a possible result of differential adaptation in the horizontal dimension may be an increasing inequality of opportunity if, as suggested, the best schools are getting better at a faster rate than the poorest schools.

Differential adaptation between levels may also lead to serious problems. Open-learning-system opportunities on the college level may not be taken advantage of by students who have been acclimated to closed-teaching systems. Conversely, students acclimated to open-learning systems at an early age, may lose the impetus toward self-directed learning or display considerable hostilitly in some instances. If closed-teaching systems are encountered at later ages. Many of the benefits of the Headstart program, for example, have been lost when students have encountered the traditional closed system practices of elementary schools. Similarly, students who have tasted independence in high school would certainly expect nothing less in college.

c. Full adaptation and generational inversion.—It can hardly be expected that all educating institutions at all levels will ultimately offer open-learning system conditions. Nevertheless, the overall transformation may be so widespread as to suggest an outcome of full adaptation, whereby all students are provided opportunities to maximize the development of their abilities.

Such an idealized state nevertheless suggests a profound consequence, for each age cohort would have a better chance of developing human potential than preceding or older-age cohorts. Students presently in a new open system have more opportunities to learn than those who have graduated from a closed system; and students at elementary levels who have known only open-system conditions will be further advanced at the high school level than the present high school students who may be encountering open learning systems for the first time. With each age cohort increasing its capabilities relative to the one preceding it, generational inversion may become increasingly evident.

Although the young have much to learn, especially in the broad area of experience that we call wisdom, one can already see the early signs of generational inversion in what is euphemistically called the generation gap. For, in many respects, the young are better fitted to this world and the world of tomorrow than their elders. Political education campaigns launched on university campuses are an early form of the young teaching the old in what Margaret Mead has called "prefigurative culture."

HASTENING THE FUTURE

Although the variations in the BLTMT in education have been present singly, societal complexity is such that the most probable future will contain a complex mixture of all three situations. In turn, this suggests the necessary paths of action for those who are sympathetic to open learning systems and wish to hasten the future while guarding against undesirable consequences.

a. Understanding of open systems.—To avoid stagnation, conflict, and threats of supersession, attempts must be made to fully define open learning systems and to make clear their superiority in learning outcomes and social benefits. One of the functions of the synoptic chart, on which this article is based, is to facilitate an appreciation of the many facets that are involved in a fully open system. Too many open-system innovations, launched singly, are made ineffective by largely closed systems. Educators may feel giddily innovative and, therefore, complacent in the absence of any model that indicates how far they have to go.

b. More knowledge of inequality.—To avoid greater inequality and system distendedness, a far more sophisticated educational data system is required that can monitor what is happening and where. Ultimately, we may require a thoroughgoing census of education and learning, similar to the quinquennial census of manufactures that has provided information for the industrial society that we are leaving behind.

Inequality of learning opportunity is not only to be found in schools. Affluent families, living in information-rich homes and communities, also provide for many extraschool learning opportunities such as summer camps, trips abroad, tutors, and music lessons. It is to be expected that the affluent parents will be the first to take advantage of video cassettes to promote the learning of their children, similar to the provision of encyclopedias at home which presently serve as a further means to one-up the disadvantaged. Indeed, one of the problems of our future society may be to simply keep the present level of inequality from worsening, let alone attempt to narrow the gap.

c. Adult education.—Efforts at adult education will require far more attention in the future, such that, in accord with the open learning system model, school and work are interspersed throughout everyone's lifetime. There may well be a growing gap between what is known by the young and what is kown by the old, and, similar to the widening gap of opportunity, considerable efforts may be required to simply maintain the present balance. Among many traditional notions that will be painfully discarded is the obsolete view that education is for the young. To survive in our new society, we will all have to learn, unlearn, and learn.

To move from yesterday to tomorrow, the key fatcor is promoting open-learning systems may well be the disposition toward learning that is held by adults: Teachers, educational authorities, and—perhaps most importantly—parents. To change the schools and colleges, then, would first require a change in the American public. In other words, to restate an obvious but often overlooked point, educating institutions reflect their constituents and their surrounding communities, and cannot be expected to rise very far above their surrounding intellectual milieu.

THE NATURE OF OUR CHANGING SOCIETY: IMPLICATIONS FOR SCHOOLS*

BY WILLIS W. HARMAN

I. INTRODUCTION

This paper differs considerably from the usual state-of-the-knowledge report. The basic reason is that there is, in one sense, no knowledge of the future to report the state of. The times are too dynamic for the ordinary sort of projection of present trends to have much value.

To see why, one has only to imagine having, in 1958, a competently done forecast from observable pre-Sputnik trends. It would have had dubious value in guiding educational policy during the decade that followed, since the urgent issues that faced education in 1968 were hardly discernible 10 years before.

On the other hand, considerable value might have been found in an analysis which highlighted long-term educational issues and the projected consequences of alternative responses to them. Knowing these long-term issues, one might have been enabled, through analysis of changing demands on education, to anticipate such deviations as the post-Sputnik stress on science education, or the almost anti-intellectual counteremphasis on feelings, awareness, and personality growth that appeared in some quarters. These excesses would have been understood as temporary perturbations on the longer-term trend toward a new balance among the functions of education. Or, to take another example, such analysis might have brought out the collision course between the steady movement toward the affluent society and the unspoken, de facto function of the schools to differentially educate, and thus contribute to the continuance of a large underclass in which black and brown minorities are significantly overrepresented. The precise form of the eventual conflict would not have been predicted, but the anticipation of it in some form might have brought some additional illumination to bear on policymaking.

Thus, it will be our endeavor in this paper not so much to cite and summarize presently available literature relating to the future of the society and of education, but rather to provide a framework within which that literature and future analyses may be fitted. This is to say, if the attempt is successful, we will have provided the reader with a skeletal structure within which he can construct his own dynamically changing view of alternative futures and their implications for education.

As the construction of this framework proceeds, one fundamental theme will be seen to run throughout. A preponderance of the analyses of the near-term future (that is, the remainder of the twentieth century) pose, implicitly or explicitly, a challenge as to whether the operative values which have served to bring us to the present point of technological and industrial development will continue to serve well in dealing with the problems created by that development. (By the term "operative values" is meant those values which would be inferred from actions taken, not those for which we profess allegiance.) The forecasted consequences of continuing present trends suggest a need for altered values. On the other hand, as we shall see, analyses of revolutionary forces show that a corresponding thrust toward new operative values is evident. Whether this thrust becomes dominant, or plays itself out as a historical transient, is a key uncertainty of the future.

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*Prepared for the ERIC Clearinghouse on Educational Administration, Eugene, Oreg., October 1969.

The goals assigned to the overall educational undertaking, and hence all of educational planning, are centrally affected by the ultimate outcome, of this value-choice crossroads. For this reason, it has been used as the most prominent member in our framework for viewing the future, or, more precisely, the available alternative futures. This crucial choice is particularly evident in section III, where two particular alternative futures are singled out for more detailed description, and in section VI where the value alternatives are related to basic philosophical premises. It plays a less conspicuous role in the other sections.

In the next section we shall examine some of the major trends identified in extant surmisings about the next three decades. By no means is there consensus among forecasters as to the success we are likely to have in solving some of the perplexing social problem ahead. However, almost all analysts admit to the seriousness of those problems. A significant weight of opinion backs the proposition that new technological remedies are not adequate treatment for technology-spawned problems, and that changes in values are essential to a satisfactory outcome.

A different cut at these same data is taken in section III. Among the various alternative futures implicit in the differing projections of assorted futurists, two are compared. One of these assumes the basic operative values of the decades ahead to be more or less the same a in the decades just left behind; the other postulates a rapid and drastic shift. While the future is likely to be neither one extreme nor the other but somewhere in between, the comparison serves to highlight the issue involved.

It is a fundamental concept in cultural anthropology that significant differences between cultures are essentially differences between commonly held or dominant basic ideas and standards. Similarly, alternative future states of the society represent, in some sense, alternative dominant belief-and-value systems. This point of view is examined in section IV.

In the fifth section, we shall examine the contemporary revolutionary forces in society and attempt to provide a schema for making sense out of the rapidly developing events on this stage. Numerous partial explanations are examined for the rebellion of youth and the sequence of revolutionary acts in the sixties. Since these explanations, either individually or when combined, seem unconvincing and inadequate as interpretations of the total scene, the possibility of an underlying conceptual revolution, as yet dimly perceived, is put forth in section VI. Here is examined the hypothesis that today's perplexing revolutionary activities may be usefully interpreted as indicators of a subtle changing of the basic premises of our culture, comparable in potential impact to the Protestant Reformation. The main point in such a comparison is that if such a transition is taking place, better understanding of it may reduce our anxieties and help in the rational formulation of policies which will contain those subversive forces which have to be contained, while minimizing the violence of "religious wars" which might accompany the change.

Section VII summarizes what has gone before by attempting to extract from the trends, alternative futures, value conflicts, and revolutionary forces, a set of meta-issues upon which appear to hinge the most significant future-determining choices ahead. Typically such a social choice—take for example the national commitment to some form of social security—is only to a very limited extent a consequence of the conscious decisions of designated policymakers. It also involves multitudinous minor decisions of persons of lesser prominence, many of whom are not conscious of having made a choice at all. Yet how the society as a whole moves with regard to these overriding issues will profoundly affect its future history.

Finally, in the last section, we suggest some of the implications of the foregoing for schools. Analyses of alternative future states of this society have two major uses for educational planners. In the first place, since even the near-term future can, at best, be only crudely known, plans need to be examined not only in the context of what is considered to be the most likely future, but also for compatibility with other plausible futures. Secondly, through study of alternative futures we can see more clearly the role of education in helping to determine which of the possible alternative futures actually comes into being.

II. Apparent Long-Term Trends

As Kahn and Weiner have noted (1967), a "basic, long-term, multifold trend" of society may be observed, which provides a useful baseline against which to contrast alternatives. (That is to say, this trend is not a prediction, but more like a centroid of likely alternatives.) More or less general agreement is found among forecasters with regard to the major components of this central trend as summarized below.

ECONOMIC-POLITICAL

Worldwide industrialization and modernization.—The preponderant trend in the sense of forming a background context for all else in the political and economic realms is undoubtedly what Robert Heilbroner (1963) terms The Great Ascent, the continued industrialization and modernization of the entire world, and particularly the attempt to accomplish this for the largely tropical belt of underdeveloped areas.

The necessity of a shift from a parochial to a one-world view of Spaceship Earth hardly needs defense. Frequent reminding comes from awareness that through present world communications networks repercussions of local events are rapidly felt and reacted to around the world. Ecological problems are world problems. Production/distribution and communication/transportation systems are essentially global.

They require, and depend upon, the resources of the entire planet and, more importantly, the global interchange of research, development, and technical, and managerial expertise. Most significantly of all, perhaps, there are no local political and economic problems any more. Political events in remote lands, famines or other catastrophes in underdeveloped countries, all have direct and immediate impact on the technologically developed world.

On this one-world stage the dominant event is The Great Ascent:

> The process of economic development . . . visible throughout the newly awakened areas . . . is a worldwide struggle to escape from the poverty and misery, and not less from the neglect and anonymity, which have heretofore constituted "life" to the vast majority of human beings. It is not mere rhetoric to speak of this attempted Great Ascent as the first real act of world history. Certainly in size and scope it towers over any previous enterprise of man . . . [It] is not merely a struggle against poverty. The process which we call economic development is also, and in the long run primarily, a process through which the social, political and economic institutions of the future are being shaped for the great majority of mankind . . . On the outcome of this enormous act will depend the character of the civilization of the world for many generations to come, not only in the poor and struggling nations, but in the rich and privileged ones as well. (Heilbroner, 1963, p. 9).

The economic development of the world is likely to be marked by profound revolutions of rising expectations," disharmony, and social discontent; the almost inevitable gaps between expectations and accomplishments may well breed political authoritarianism and economic collectivism; the process will almost surely not be accomplished smoothly and according to plan. The educational jump from a tradition-bound peasant society to a modern industrial one is immense. Strong infusions of knowledge as well as capital will be required if the underdeveloped world is to succeed in this ambitious attempt.

Institutionalization of change.—Emergent change, not homeostasis, is the order of the day. The trend is toward institutionalization of the process of research-development-innovation-dissemination, and toward the development of organizational forms adapted to promoting change.

Emergence of a "knowledge society".—Drucker (1969) describes this development in detail. The emerging society is based upon knowledge as the central capital, with educational and intellectual institutions playing a key role (Bell, 1967). Demand grows for skilled, semiprofessional laborers, and diminishes for unskilled, unknowledgeable labor. Some writers have speculated about the future problem of increased leisure as a consequence of the cybernated society. More likely is the prospect of 40-hour (and up) weeks for the knowledge workers and unemployment for the untrained. There will be an expanding fraction of the populace involved in education, and an expanding fraction of the national income going to education. There will also be an increasing involvement of education with other social institutions.

SCIENTIFIC-TECHNOLOGICAL

Accumulation of scientific and technological knowledge.—The one forecase upon which practically all analysts agree is that of an increasing level of applied scientific knowledge, and an increasing degree of cybernation. Kahn and Weiner (1967) list a hundred likely technical innovations, and Chase (1968) describes the society which may result.

Increasing lag of technological solutions behind technology-created problems.—Examples abound. Increasing industrialization creates problems of resource depletion, fouling of the environment, waste disposal, technological unemployment, congestion, and assorted urban ills, problems which show no sign of doing anything but increase. Medical advances are largely responsible for dramatic rates of population growth and consequent overpopulation and food supply problems. Advances in weapons of mass destruction and their delivery systems have brought us to the threshold of an internecine conflict which resembles some of the nightmares of yesterday's science fiction writers.

Robert Heilbroner, in "The Future as History" (1960), points out that the new forces generating problems in the Nation today are essentially extensions of three main currents of American historical development—namely, rampant scientific and technological development, extension of opportunities to the underprivileged, and increasing social control over private economic life. Those same currents are likely to continue, and so are the problems.

SOCIAL-ECOLOGICAL

Increasing problems of ecological balance, environmental deterioration, population concentration, and food supply.—There is no indication that any of these problems will do other than get worse in the years immediately ahead. A drastic shift in values to supplement regulatory action seems necessary to reverse trends toward increasing ecological imbalance, pollution of air and water and soil, and nuclear and agrichemical contamination. Although we hear brave tlk of solutions to population and food problems through such means as new methods of contraception, floating cities and undersea communities, increased yield by crop breeding, and farming the oceans and coastal deserts, most projections indicate that at best these measures will only ease the problems somewhat.

Increasing affluence, with increasing self-consciousness of the underclass.—The worldwide trend toward increasing per capita income will continue, but with a more rapid rise in the industrialized countries, thus increasing the gap between have and have-not groups. Both in this nation and around the world, increasing pressure to redress the imbalance can be expected from the have-nots.

Growth of a knowledge elite.—Trends toward increasing bureaucratization and toward knowledge as power taken together suggest the development of a meritocratic, knowledge-power elite. Bell (1967) goes so far as to predict that "not only the best talents, but eventually the entire complex of social prestige and social status, will be rooted in the intellectual and scientific communities" (p. 30).

Increasing interdependence of social and political institutions.—Partly in response to these world problems, we can expect a continuation of the trend toward limited-purpose international organizations and corporations (together with attempts—probably unsuccessful—to move further in the direction of a strong United Nations). Movement will also continue toward recognition, in institutional forms and practices, of the interlocking nature of economics, technological development, education, health, and the social order.

Within the Nation, the trends toward greater urbanization and industrialization will continue and, with them, the increase of associated problems—urban decay, technological unemployment, congestion, poverty concentrations, crime, and accumulation of waste products. These trends, too, contribute to pressure for increasing social control, increasing pluralism of institutional power (with ethnic, economic, and age minority groups insisting on representation), and increasing meshing of the activities of local, State and Federal government agencies, business corporations, and nonprofit institutions. Detailed central control may tend to be replaced by generalized central control with local units making decisions on the specifics of carrying out broad policies.

CULTURAL-PSYCHOLOGICAL

Increasing proportion of growth-motivated persons.—Past trends of increasing affluence, increasing levels of education, and changing child-rearing patterns combine to indicate that an increasing fraction of the population will be, in Maslow's terms, growth-motivated rather than deficiency-motivated. This shift is showing itself in the higher valuations placed on the feeling and subjective side of life, on self-realization, and on finding meaning and significance in work. There is, in addition to more questioning of traditional work values, a tendency to blur the distinctions among work, leisure, and education.

Increasing stress-producing forces on the individual.—These include continuing international and domestic tensions, fear and hostility in the cities, rapid obsolescence of job skills, increasing complexity of the individual's network of interpersonal relations, and instabilty and change in life patterns. The future will be characterized by a good deal of fear of change, fear of powerlessness, fear of loss of privacy and independence, and fear of insecurity. This will give rise to counterforces opposing some of the trends listed above.

"UNSOLVABLE MACROPROBLEMS"

There stand out, from these predictions, two problems which we might well term macroproblems. The effects, and the urgency of their ultimate solutions, are worldwide in scope. They are already serious and will undoubtedly become more so. And most significant of all, there is good reason to assume that they will not be solved within the context of present operational values. The first is what Kahn and Weiner term the problem of our Faustian powers. The second is the poverty of the high-breeding-rate masses of the underdeveloped nations.

The Faustian powers humanity has gained through rampant development and application of technology have already brought us to the threshold of overpopulation (through technology-reduced mortality rate); pollution of air, water, and soil; extensive unemployment of the unskilled; paralyzing air and surface traffic congestion around urban centers; and the threat of nuclear holocaust. These have been the consequences of the unspoken policy that whatever technology would make a profit for an individual or an organization, or would contribute to a nation's ability to carry on warfare, that technology would be developed and applied. But now this policy has brought us to what Archibald MacLeish has called (1968) "the Great American Frustration"—the feeling that we "have somehow lost control of the management of our human affairs, of the direction of our lives, of what our ancestors would have called our destiny" (p. 13).

For it has become clear that we have now, or could develop soon, the power:

> Through human engineering, to modify indefinitely the bodies of selected individuals, for reasons ranging from scientific curiosity to prolonging life;
>
> Through genetic engineering, to modify the characteristics of the human race and to shape the course of evolution;
>
> To change to unlimited extent the physical characteristics, and the plant and animal population, of the biosphere;
>
> To alter to unlimited extent men's mental and emotional characteristics, including intellectual abilities, motivations, affect, personalities, and character;
>
> Through weapons of mass destruction, to annihilate large segments of the human race and devastate large areas of the earth; and
>
> To change significantly, in many other ways, the kind of world which is handed on to the next generation.

Past experience gives us little assurance that the predominantly economic values and laisez-faire policies which have thus far governed industrialization and technological development will suffice to insure that such potent powers will be used for the overall benefit of humanity. Our past practice has been to allow arms races, or pollution, or enviromental degradation, or ecological imbalance, or denuding of the land to proceed until the situation was obviously becoming intolerable, and then attempt some sort of corrective action. This may not be good enough in future.

Wheeler (1969) argues that some sort of control of the flow of scientific and technological innovation is as necessary now as economic controls of capital flow have been in the past. Furthermore, this control must be transnational, involving at a minimum all the highly developed nations.

It seems clear that this sorcerer's apprentice problem calls for more than simply different policies. Some new institutional form, in addition, will be necessary. But even more may be required. In the end the issue is not one of technology but one of values. The question is not one of devising managerial technology to control technology, but rather the more fundamental question of whether the operative values which served so well in the development of modern technology are basically capable of handling its humane application. Peccei (1969, p. 135) sums it up:

> **The ambivalence, ambiguity and unpredictability deemed to be linked to technology are man's. Whether the sum total of its effects will eventually be disruptive beyond repair, or fruitful beyond hope, depends essentially on him . . . Villain or savior, perverter or healer—technology will just play the role man assigns to it. But one thing is not possible: That man may himself go on (irresponsibly) playing with the tremendous force of technology. He can no longer remain an apprentice sorcerer. He has to master his technology. What he must realize is that his function has changed. As Julian Huxley said, "His**

> role, whether he wants it or not, is to be a leader of the evolutionary process on earth and his job is to guide and direct it in the general direction of improvement."

The second unsolvable macroproblem centers around the tendency for the gap between industrialized and underdeveloped nations to worsen in spite of deliberate programs aimed at closing it.

This comes about as a combination of two powerful factors, the self-regenerating acceleration of technological and industrial development in the prosperous nations, and the staggering problems in the overbreeding and underdeveloped societies. In the latter countries, where the major impact of modern science has been to lengthen the average breeding period and dramatically upturn the population growth curve, population is doubling in a generation or less. Merely to maintain their current subhumanly adequate standard of living requires more than their available capital resources; they lack a sufficient force of trained teachers, technicians, and managers; they have little industry, and need to make good enormous arrears in food production, education, road building, housing, and sanitation.

Ethical considerations quite aside, the existence of this growing disparity in quality of life poses a constant threat to world stability.

> Extreme poverty, when combined with ignorance, breeds . . . the resigned acceptance of a subhuman lot. But extreme poverty, when it is combined with the knowledge that some societies are affluent, breeds envious desires and the expectation that these desires must of necessity, and very soon, be satisfied . . . By means of the mass media some knowledge of what life is like in affluent societies has been widely disseminated throughout the world's underdeveloped regions . . . In the context of a three, or even of a two, percent annual increase in numbers, high expectations are foredoomed to disappointment. From disappointment, through resentful frustration, to widespread social unrest the road is short. (Huxley, 1969, p. 16.)

Again the immensely and complexity of the problem are sobering. It does not appear politically feasible, given present operative values, for the governments of the prosperous nations to contribute foreign aid which is at all of the magnitude required to bring these nations to the takeoff point. As regards the private sector, the rationality of the profit motive tends to limit severely the investment in delayed-payoff but essential buildup of human capital. Without this human development it will continue to be more profitable for business to invest in European and American affluence, rather than in third-world poverty. Thus the prospects for the underdeveloped countries are dim, yet the potential costs of failure to solve the world's poverty problem are frightening to contemplate.

Again the question is whether the values which served well enough for isolated villages, or even isolated continents, will suffice to guide a single integrated planet. If they will not, then this is the most important single thing to know in designing the education of the future. For if values are to be changed, this must be through an educative process.

III. Two Contrasting Forecasts

Confronting the decades immediately ahead, we are tempted to paraphrase Charles Dickens as he opens A Tale of Two Cities: It will be the best of times, it will be the worst of times, it will be the spring of hope, it will be the winter of despair. Within the forecasts from which the basic, long-term, multifold trend was extracted are to be found a broad range of portrayals. At one extreme are descriptions of the utopian benefits of technology relieving man once and for all of concern over supply of human wants, providing unlimited leisure and universal education, and fostering democratic freedom and equality such as only a high-technology affluent society can do. At the other extreme, we find dire predictions of uncontrollable fouling of the planet, reduced privacy and political significance of the individual, and widespread over-population, poverty, famine, and civil disorder. What sort of order can we bring out of this divergent prophesying?

Since we cannot know the future, and in fact must proceed under the assumption that we have some freedom of choice in affecting the

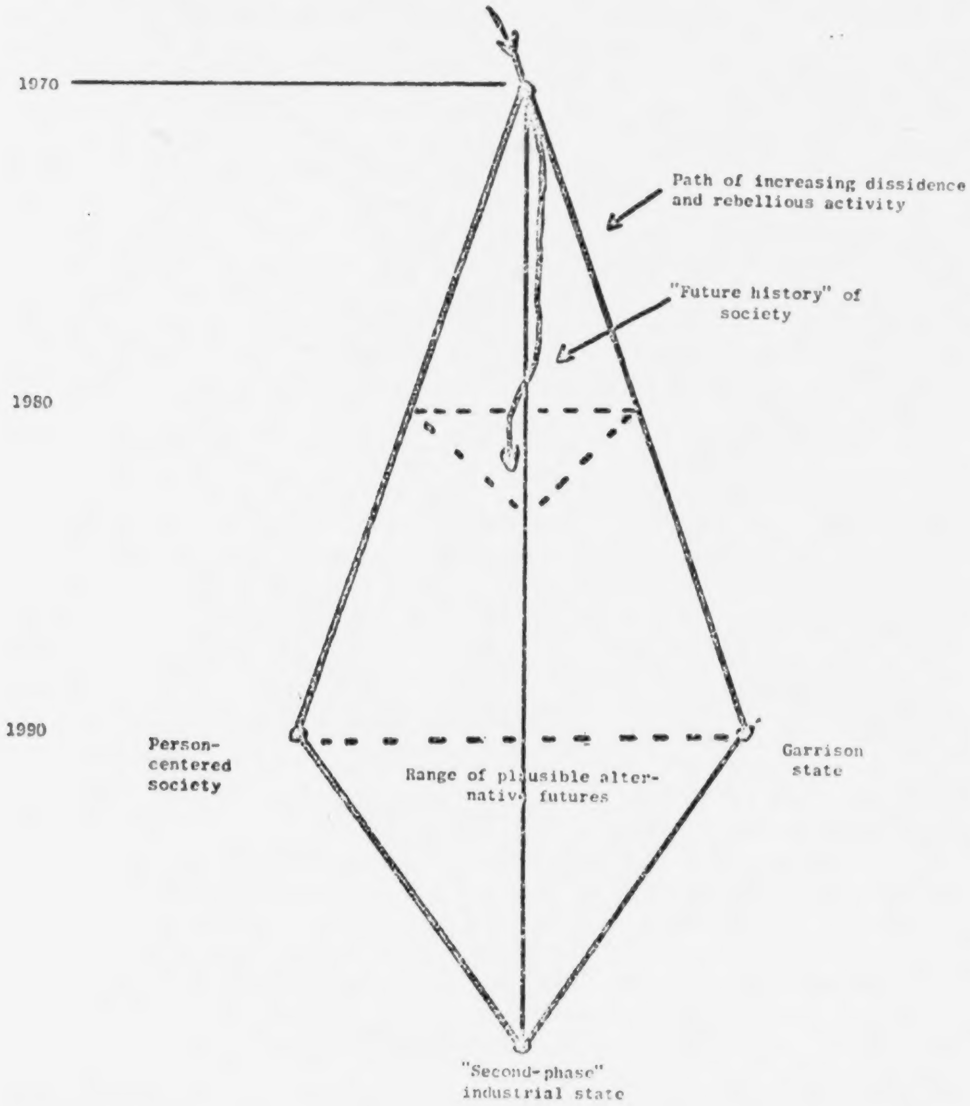
1970
Path of increasing dissidence and rebellious activity
"Future history" of society
1980
1990
Person-centered society
Range of plausible alternative futures
Garrison state
"Second-phase" industrial state

Fig. 1

future, we can most profitably speak not of a predicted future, but of a range of plausible alternative futures. Figure 1 is an attempt to show the concept diagrammatically. If the level of increasing dissidence and rebellious activity were to continue to rise, and with it the level of counteractive repression, it is conceivable that we might move toward a garrison state by, say, 1990. On the other hand, if the basic, long-term, multifold trend is extrapolated we arrive, more or less, at what might be termed a second phase industrial state, to be described below. The general idea is that the actual future history of the society will probably not be a straight line path to one or another of these possibilities, but rather will be a wavering pathway to some mediate state.

At the ever-present risk of oversimplifying to the point of distortion, let us compare two of these alternative futures for, say, the last decade of the century. I will term them the second-phase industrial society and the person-centered society. The former is the sort of description which might emerge from a weighted summation of the multifarious trend projections, Delphi forecasts, and brave-new-world predictions which abound in technical and popular literature. (It is similar, in its basic concept of extrapolation of present trends, to The Most Probable World of Chase (1968).) The person-centered society is a composite picture based on the views of a group of writers and analysts who assume (or hope) that a rapid change to some kind of posteconomic institutionalized values will take place. This group includes, among others, John Kenneth Galbraith, Michael Harrington, Erich Fromm, John Rader Platt, Kenneth Boulding, Robert Theobald, and Abraham Maslow.

These two futures are not presented, even by their proponents, on an equal basis. The first assumes a relatively continuous transition from the first-phase industrial society, which has so far lasted from the Industrial Revolution to the present, to the second-phase computerized, cybernated state. Implicit is the further assumption that such trends as the expanding economy and the advancing technology have, so to speak, a life of their own. Once set in motion, their own dynamic nature carries them forward. Thus it is appropriate to project them ahead and ask such questions as, "what effect will increased knowledged in bioengineering have on human values? To be sure, the advance of technological achievement will bring with it such new social problems as industrial pollution, poisoning by agrichemicals, encroachment on privacy, traffic congestion, and threat of nuclear destruction, which are our present heritage. But these problems, in turn, will be solved by still higher technology.

The second forecast, the person-centered society, assumes, by contrast, a significant discontinuity with past trends. Its proponents tend to view our present time of troubles as a transition period to a state radically different from the present, both in institutional forms and in institutionalized values. The level of technological development would be comparable with (or somewhat lower than) that in the first forecast, but the uses to which technology would be put might differ significantly. The value shift would be in the direction of a more person-centered culture. Critics of this forecast would say it is unrealistic; critics of the first would say it is undesirable, if not self-destructing.

THE SECOND-PHASE INDUSTRIAL SOCIETY

In both of these forecasts we can assume that certain trends and developments are here to stay, at least for the near future. One is a high and increasing level of technology and of cybernation. Second is the conduct of most purposeful activities by large-scale centralized organizations, such as those developed in government and industry in recent decades. Further, distinction between public and private organizations will no doubt become further blurred, as it already has in military procurement, space exploration, and atomic energy. Planning will tend to replace the market mechanism in controlling the flow of money.

In the second-phase industrial society, cybernation will have taken over, and will do better, many of the tasks for which men's minds are presently trained. Those who are leading exciting lives at the managerial or technological forefront of the advancing society will probably work as long hours as at present. For the rest there will be increased leisure to be used for recreation or education. On the whole, there will be more years of education per person and a near-hundred-percent literacy rate.

Research and services will play a more dominant role, production less. Intellectual institutions (universities, research laboratories, think-tanks, systems analysis centers, etc.) will play a more significant role. Change—the research, development, and innovation process—will be institutionalized. That is, institutions will be facilitators of change rather than impediments to change. These developments will result in the growth of, and concentration of power in, a bureaucratic and knowledge-based meritocratic elite, a highly professional and intellectual class which will comprise a network linking the widespread governmental, military, university, research, policy analysis, urban development, financial, commercial, and industrial organizations. Highly centralized and intensive (though possibly subtle) social control will be weilded over vocational training, worker mobility, work attitudes and consumer habits.

New applied technology will have affected life in many ways. New types of household devices, many based on small computers and elaborated communication services, will be available, not only transforming the life of the housewife, but also allowing education and various forms of business to be carried on in the home. Through cybernation and genetic management of plants and animals, the agricultural industry will be made many times more productive in terms of use of land and labor. Coastal desert lands will be made habitable with desalinated water. Nuclear power and fuel cells will provide ample energy for all demands. Automated factories will produce practically all consumer goods, with variety programed in to satisfy customers. New transportation systems will have more people traveling further, faster. The housing industry will indeed have become an industry, producing new types of improved housing with mass production economy, yet with esthetic and functional variety.

There will be variety in cities too, with specialized forms—scientific city, university city, festival and ceremonial cities, recreation city, experimental cities—and planned communities. Experiments with alternatives to the main patterns of living (precursors being communes, bohemian urban communities, substitutes for marriage, etc.) will be commonplace. Schools in the forms we have known will virtually disappear. Instead, education will take place via combined systems of machines and human assistants located in homes, neighborhood centers, specialized learning centers, museums, and industrial and business locations.

Along with these advantages there will be some problems. Because of the lag in modernization of underdeveloped countries, the gap between rich nations and poor nations will grow even larger. International organizations of various sorts will homehow have managed to contain the nuclear threat, and will have made great strides in fostering economic development of poor nations, but there will still be international strife and the economy will continue to be semimilitarized. Fed by the dynamic character of science-technology, and unchecked because of failure to find any satisfactory alternative to technological approaches to international problems, the arms race will have continued to escalate.

There will be internal tension too. Although some progress will have been made on the poverty problem, the white-nonwhite conflict will continue, and the alienated young of the sixties will be raising another generation, also alienated. However, the law enforcement agencies will have regained the initiative, violence and counterviolence will be under control, and conflict will mainly take the form of widespread subterranean resentments.

It will be interesting to speculate on the nature of these dissenting views. The dissenters will be, on the whole, at a higher level of material well-being than in the sixties, and better educated. We can imagine their criticism of the basic contradictions in the society as follows: The operative goals of the society are continuing expansion of output (goods and services), a companion increase in consumption, technological advance, efficient use of resources to these ends, and the public images that sustain all these. Individual lives are to be spent in the service of these goals. Human wants rate lower than—and thus must conform to—the needs of the industrial system. State policies, the educational system, and conventional morality are molded to fit the requirements of the system. Although the necessity to close the gap between rich and poor nations is recognized, it is uneconomical to trade freely with them or to invest heavily in their balanced economic development. The need is recognized to abolish the slums, poverty, and racism, and to provide adequate education and equal opportunity to the poor minority, yet it is uneconomical for private capital to do this, and effective government action is opposed by threatened lower-middle and working-class whites. Humans need contact with nature and beauty, but it is uneconomical to design a humane urban environment or to provide money for parks, esthetics, history, or civility. Although the channels of mass communication offer a great potentiality for public enlightenment, they are used mainly to promote sales and distribute propaganda for business and government interests. Somehow the social system is not serving the interests of the individuals who comprise it; nothing short of a radical change in the operative values within it can alter this fact.

THE PERSON-CENTERED SOCIETY

In the humanized technological society of the contrasting forecast, it is precisely these operative values which have changed. The goals of the society include making economic growth meet human needs, achieving knowledge and esthetic advance and controlling social problems so that individuals may progress toward their own goals of self-fulfillment. The industrial system is subservient to, and responsible to, these larger purposes of the society. The overarching goal is the cultivation and enrichment of all human beings, in all their diversity, complexity, and profundity.

In the forecasts which describe this society, each individual will be provided enough resources, and in such a way, as to enable him to live in dignity. Underlying the economic system will be the proposition that each free man has the right to a full life, which includes useful, rewarding work and self-development. Economic security will not be achieved solely by welfare payments or guaranteed incomes. In part, at least, it will be accomplished by an extension of the principle of free goods and services from those already provided (elementary, education, library services, fire and police protection, inoculations, lunch milk for children, etc.) to include others (such as reeducation for a new occupation, food and nutrition staples, urban transportation, etc.). In the "knowing society" (Drucker, 1969) education will be as central to the economy as mass production has been in the past. Thus, education is a valid occupation, entitling the educatee to subsistence as well as the opportunity to learn. A diversity of educational paths will be available, and men will not be judged on the basis of a single uniform academic standard. (Competitive grading, therefore, will assume much less significance.) Similarly, the society will provide a diversity of ways in which a person can win the esteem of others. In other words, economic failure or academic failure will not be equated with failure as an individual.

Mumford (1965) has analyzed the basic attitude shifts that would have to accompany conversion to the person-centered society. There are, he says:

> Serious reasons for reconsidering the whole picture of both human and technical development on which the present organization of Western society is based . . . The deliberate expression and fulfillment of human potentialities requires a quite different approach from that bent solely on the control of natural forces . . . Instead of liberation *from* work being the chief contribution of mechanization and automation, liberation *for* work, for educative, mind-forming work, self-rewarding even on the lowest physiological level, may become the most salutary contribution of a life-centered technology.

The society will be a planned society, but planned in such a way as to deepen, not diminish, the freedom of the individual. Opportunity will be provided for real participation in planning by those for whom the planning is done. Management structures will be such that power flows both ways.

The technological level will be high, as in the second-phase industrial forecast, but the priorities for technological development will be influenced by human and global needs. The problems of the ghetto and of the underdeveloped societies will not have been completely eliminated, but their solution will have had high priority. As a consequence of these efforts to respond to human needs, and also as a consequence of the way people perceive the goals of society, international tensions will have lowered and internal alienation will have decreased markedly. The military establishments of the industrialized nations will have moved a long way toward cooperation in an international policing role. Internally, new standards will goven the recruitment and training of officials responsible for maintaining justice and order, and the image of the police will be that of protector of all, with fairness and justice to each, regardless of skin color, economic condition, or type of haircut and beard.

Education will center on developing self-learning habits and skills, problem-solving and decisionmaking abilities, individuality, sound valuing capabilities, capability of continuous self-renewal, and self-understanding. Education will be much more equated with life, and with the distinction between formal and informal education having become blurred, will be much more a lifetime activity. The significant distinctions will not be work versus education or work versus leisure, but work-education-leisure versus killing time.

Hutchins (1968) describes the learning society as:

> One that, in addition to offering part-time adult education to every man and woman at every stage of grown-up life, had succeeded in transforming its values in such a way that learning, fulfillment, becoming human, had become its aims and *all its institutions were directed to this end.* This is what the Athenians did . . . They made their society one designed to bring all its members to the fullest development of their highest powers . . . In Athens, education was not a segregated activity, conducted for certain hours, in certain places, at a certain time of life. It was the aim of the society . . . The Athenian was educated by the culture, by Paideia.

The Athenian education was made possible by slavery, which was the necessary provider of leisure. But "machines can do for every modern man what slavery did for the fortunate few in Athens. The vision of a learning society * * * can be realized * * *. Whether it does or not depends upon the transformation of values."

But a set of values, in turn, are based upon a conception of the nature of man, his potentialities, and the possibilities for their manifestation. That is to say, the choice between the two alternative futures we have described is also in a sense a choice between two images of man.

IV. Beliefs and Values in Transition

Thus far, we have postulated that the values of society are, or may be, in transition. Advancing technology has an impact on values. (Perhaps more fundamentally, values have an influence on what technology comes into application.) So also may values alter as a consequence of perceiving that past values are leading us into untenable situations. In the preceding section we argued further that a choice among significantly different alternative futures is implicitly a choice among belief-and-value systems (Baier and Rescher, 1969).

FOUR BELIEF-AND-VALUE POSITIONS COMPARED

Let us now compare summary descriptions of four belief-and-value positions which are interacting at the present time to generate the future. They are:

A. U.S. middle-class (traditional);

B. New values (proposed by humanistic-psychology writers and forerunner youth);
C. Behavioral science; and
D. American origin (implicit in founding documents and Western political tradition).

It is apparent that the new values (B) are currently challenging the traditional ones (A). One naturally looks to the behavioral scientists to see if they are uncovering any new knowledge of human behavior and characteristics which would shed light on the controversy. It looks very much as though the behavioral sciences have an implicit value system of their own (C) which is not neutral with regard to the conflict. In view of this observation, it becomes of interest to compare all three of these with the set of values on which the nation is presumably based (D). This we propose to do briefly, after first summarizing in comparable formats the four sets.

A. U.S. middle-class traditional beliefs and values

We mean by this title the beliefs and values which have dominated U.S. industrial society and which today's youth tend to reject, at least in part. It is difficult to be explicit, since the values of the middle class are changing and have clearly departed considerably from what they were in the 1930's, both in the direction of diversity and pluralism, and in an overall shift toward the new values described below. This belief summary describes, at any rate, a representative position.

Beliefs.—Implicit in this belief-and-value system is that, while religious beliefs are good to have as a basis for mortality, the values derived from the Judeo-Christian tradition will stand by themselves on a pragmatic basis. Hence, there tends to be little emphasis on specific religious beliefs or metaphysical premises as a source of values; atheists, agnostics, Christians, and Jews are expected to have more or less the same values. Thus, without being tied to a particular cosmology there tends to be a generalized belief—

in the perfectability of man and in his ability to better his position through his own efforts;
in material progress as the meaning of social progress; and
in humanitarianism and a moral orientation to the world.

Individual-rights values.—A high value is attached to the rights to (1) individual pursuit of economic security and happiness, (2) personal liberty (freedom, privacy, and property rights), (3) equality of opportunity and justice, and (4) essential respect as a human being. These rights are strongly tempered by the ethic that one must earn what he gets, through industry and persistence.

Life-setting values.—Value is placed on the orderly society, with social roles and rules for transition well-defined, and domestic and civic virtues commonly held. Pleasantness of environment and the esteem of others are prized. Meaning in life centers largely around success and achievement in terms of money, property, power, and status. For these goals one is willing to sacrifice present pleasures and postpone gratification until the future. Self discipline, hard work, and efficiency and productivity are honored; the emotional life should be well regulated and rationalized.

Personal characteristics.—The following personal characteristics are valued: Industry, integrity, dependability, self-sufficiency, rugged individualism, control of inner feelings, moderation, rationality, orderliness, regularity, conformity, pragmatism, cleanliness, responsibility, loyalty to family and firm, patriotism, Apollonian style, action as contrasted with contemplation, youthfulness.

B. New values

These are the beliefs and values of the humanistic and existential psychologists (Erich Fromm, Abraham Maslow, Carl Rogers, Rollo May, etc.) and the youth culture labeled forerunner youth by Fortune magazine in a recent survey (January 1969). This position is much more explicit than the previous one in what it affirms about man.

Beliefs.—Basic premises include the affirmation that fundamental to all else in human experience is awareness, and that through his awareness of himself and of his relations to others and to the universe, man can discover values which are wholesome in terms of promoting his growth toward the most fully human state and his actualization of his highest potentialities. Man responds to a hierarchy of perceived needs, but ultimately his basic dynamic is toward growth and becoming.

Individual-rights values.—The highest value is attached to the individual's right to pursue self-fulfillment, personal liberty, equality of opportunity and justice, and essential respect as a human being. These values are considered to be not just pragmatically desirable, but rather to follow directly from the affirmation of the essential validity of inner experience and from the collective subjective experience of the race.

Life-setting values.—Meaning in life centers around the discovery and actualization of one's highest potentialities, the pursuit of self-fulfillment. The desirable environment is one which promotes growth and fosters inner freedom; that is, it is truthfully responsive and ultimately supportive, as the therapist is to his client. Self-discovery experiences are to be sought after, not avoided. Thus conflict and ambiguity are not threats to the good life, but pathways to it. Beauty and deep personal relationships are highly valued, again because in experiencing them one more fully experiences himself.

Personal characteristics.—The following personal characteristics are valued: Openness, authenticity, integrity, sensitivity, aliveness, spontaniety, self-honesty, balance between or transcendence of opposites (reason/emotion, Apollonian/Dionysian, work/play, self/not-self) (Maslow, 1967).

C. Behavioral science

There is, of course, no single viewpoint which faithfully represents the views of behavorial scientists as they apply their knowledge to matters of social policy and social values. However, one could perhaps think of some kind of center-of-gravity viewpoint. The attempt is important because the behavioral-science viewpoint is influential, and because it is espoused by so many of those who wrestle with social policy questions. A reasonable approach would seem to be to examine writings of behavioral scientists relating to social problems, and the textbooks from which behavioral science is taught. The latter particularly are strongly influenced in their implicit premises by the behaviorist tradition in psychology and by Freudian psychoanalytic theory.

Beliefs. The basic premises include the assertion that human behavior can best be understood as an interaction among more or less stable characteristics of the individual and the immediate situational context. The individual characteristics—personality pattern, values, goals, etc.—arise in turn from the historical interaction between physiological needs and instinctual energies and desires on the one hand, and environment—particularly that of early childhood—on the other. Socially acceptable behavior is arrived at through socialization (conditioning) processes.

The behavioral-science position tends to be reductionists, especially regarding such higher values as freedom, justice, love, cooperation, reason, courage, free will, truth, beauty and goodness, self-fulfillment, and responsibility, regarding them as sublimations of instinctual drives or as more straightforward cultural conditionings. Thus, the basic value position is one of moral relativism.

Individual-rights values.—Such rights as the individual pursuit of happiness, personal liberty, and equality of opportunity are deemed good ones for a society to have on a rational, pragmatic basis. However, altruistic behavior is basically at variance with man's instinctual (aggressive, territorial, etc.) nature, and it has to be instilled by the culture.

Life-setting values.—Likewise, such values as social order, justice, social consciousness, democracy, humanitarianism, public service, morality, achievement, etc., are perpetuated by the culture because of their usefulness, but they have no deeper transcendental roots. Because of the implicit deterministic assumption, values such as freedom and democracy, which imply that the individual ultimately has free will and is responsible for his actions, are not only cultural inventions, but illusions.

Personal characteristics.—Various personal characteristics may be valued, particularly scientific objectivity, intelligence, and impassivity. However, it is recognized that the choice to value these characteristics is itself illusory in its freedom, since these tastes must have been culturally imposed somewhere along the way.

D. American origin

In the speeches and writings of the men who were present at the founding of this Nation are to be discerned the basic premises and central values of the Western political tradition and the specifically American additions.

Beliefs.—The most important basic premises underlying the nation's founding are that the universe has a physical and moral order, that natural law is discoverable by man, and that man intrinsically strives toward the understanding of the natural order and toward the perfection of his nature. Unerring order and universal harmony reigning throughout the whole . . . God is the power of first cause, nature is the law, and matter is the subject acted upon (Thomas Paine). Social order is to be derived from man's universal nature. The history of man is a progression in time toward a definite, a supremely meaningful end, in which human fulfillment is achieved. Man's purpose in history is to seek individual realization and social and political justice. Man has the free will to accept or reject natural purpose and natural law.

Individual-rights values.—Supreme rights are those to life, liberty, and the pursuit of self-fulfillment; to equality before the law and equality of opportunity; and to freedom with regard to spiritual beliefs and the rituals and life patterns in which those are expressed.

Life-setting values.—Among the specific life-setting values commanding high allegiance here are:

The mission of America to bring a new order into the world;

The prime function of society being to serve the individual's rational and purposeful perspectives and acts;

A binding, just, and adaptive system of common and constitutional law;

The supremacy of the general will (what people ought to want in the light of the ethic of the Western political tradition and of their own rational, individual, and social interests) over temporary popular desire;

The right and duty to resist when Government does not fulfill its responsibilities to the individual and becomes tyrannical and destructive;

Equal opportunity, special privilege for none;

Education: Enlighten the people generally, and oppression of mind and body will vanish like evil spirits at the dawn of day (T. Jefferson); and

Harmonious and successful human relations, spiritual salvation, reason, tolerance, freedom, justice, cooperation, persuasion rather than force, individual responsibility, enlightened self-interest.

Personal characteristics.—The following personal characteristics are highly valued: Integrity, responsibility, rationality, industry, self-sufficiency, fairness, spirituality, patriotism, humanitaranism, idealism.

With these summaries of four belief-and-value systems before us we have a useful way of looking at some contemporary issues. The traditional middle-class premises are congential to the second-phase industrial kind of future. The person-centered society, on the other hand, would require a shift of dominant values in the direction of the new, humanistic-psychology, and forerunner-youth basic premises. Changes in basic premises are not easily brought about; there is little indication that deliberate attempts to change basic premises and value positions, through conventional educational processes, are very successful. On the other hand, the new values appear to have a strength in today's culture which would hardly have been anticipated even a half-decade ago.

Formal education positions have been strongly affected by the behavioral-science premises in recent decades. These premises are more in line with, and supportive of, the traditional middle-class values.

Interestingly enough, the new beliefs and values turn out to be remarkably similar to those which formed the ideological basis for the founding of the Nation, as is indicated by the criticisms of disaffected youth that the establishment is false to its declared values.

Let us take a closer look at these criticisms and the dynamics of their expression, since the nature and resolution of these revolutionary forces will clearly have much to do with the choice the society makes among its possible alternative futures.

V. Manifest Revolutionary Forces

There is little need to make the case that recent years have brought a rapid growth of political and social disorder. Conflict between whites and nonwhites, at a high level, has recently become more overt and violent. At the same time, alienation of youth and minority groups from the "military-industrial-education complex" and from national aims and policies has been expressed in an increasing level of violence. Educational institutions have found themselves furnshing a stage for much of the enactment of this drama. We have seen campus demonstrations escalate from sit-ins to forcible seizures, and then to armed seizures; likewise, the responses of enforcement agencies have moved from debate to mass arrests, tear gas, and bayonets. There seems no reason to assume that events in the months to come will not involve similar expressions of dissidence.

Indeed, we may confidently expect that educational institutions will continue, by virtue of their central position in a high-technology society, to be at the center of the fray. For this reason, it will be useful to consider a framework for viewing the significance of contemporary revoluntionary forces. This conceptualization will attempt to gather superficially unrelated events into an overall pattern. Its "fit" can be seen with sureness only in historical retrospect; it cannot be demonstrated. The heuristic test is how well it seems to accommodate further developments. We may hope that this framework will help us see better how present responses to revolutionary forces relate to alternative futures.

"CAUSES" OF DISSENT

The overall situation regarding civil unrest, dissident and violence is obviously complex. At the level of manifest phenomena it has many aspects—student rebellions, ghetto riots, minority group threats, organized movements for violence and assassination, rising sentiment against the Vietnam war, deteriorating national image at home and abroad, attacks on the "military-industrial-education complex," concern over inadequate response to social problems, and demands for participatory democracy, to mention a few. At the more fundamental level of the social structure, present institutions and institutionalized roles, and present forms of power distribution, are being assailed. At what is in some sense a still deeper level, the operational values and goals of the power structure are being challenged. Under particular attack are the obsession with technocratic-economic values and the depersonalizing aspects of computerized bureaucracy. Some of these phenomena are worldwide. The underlying causes are clearly multifaceted.

To explain various of these phenomena and their appearance at this particular time, a number of causes have been proposed, including:

disillusionment with liberal promises and programs, and with hypocrisy in the social structure;

the natural rebelliousness of youth;

permissive child-rearing patterns;

the neo-Marxist revolutionary movement;

activities of foreign subversive agents and internal revolutionaries;

moral reaction against the Vietnam war;
rising expectations among have-not groups;
disillusionment with widespread competitiveness, inequity, and hypocrisy;
revolution for the thrill of it;
rebellion against impersonality and "students as commodities" attitudes in universities;
the continuing fight for civil rights;
the demand for student participation in educational decisions;
the draft;
the greater number of average years of formal education and, hence, extended period for youth to have its own, separate youth culture;
underlying anxiety over the threat of nuclear annihilation; and
neurotic reaction to a confusing world.

Such partial explanations do not, however, appear to do justice to the facts. Various evidences suggest that instead of coincident but relatively unrelated phenomena, we are in actuality dealing with a complex of highly interrelated phenomena—so interrelated that they may be profitably viewed as one intricate underlying phenomenon, of which the specific events are but manifestations. Such an interpretation is suggested by the fact that the student revolutions are worldwide. Although specific issues in Paris, Mexico City, Tokyo, Morningside Heights, Berkeley, San Francisco, and Montreal differ widely, youth unrest appears to be almost a universal phenomenon. Issues clearly transcend the strictly educational ones. Student concerns include a strong element of civil rights; student radicals may be seen in labor picket lines and union members participate in student demonstrations; targets of militant action include industrial corporations and nonprofit think-tanks.

A crisis is also often an opportunity. If, when a unified view is taken of contemporary revolutionary phenomena, constructive as well as destructive forces can be observed to be present, this fact is most important to understand. As Noam Chomsky recently observed (1969), "There now exist opportunities for change that are not very likely to recur." Perhaps the greatest danger in the present situation is that, in reacting to crush the destructive threat to the social order represented by coercive force and deliberate violence, we may unwittingly repress a constructive force for change in the direction of a fuller realization of the most basic goals of the Nation and of the Western political tradition.

TWO COMPONENTS OF REVOLUTIONARY FORCE

The two main issues implicit in contemporary revolutionary activity are:

(1) A demand for emancipation on the part of various subjugated or underprivileged groups, and

(2) A demand for societal and moral reform on the part of persons, mainly privileged youth, who are not subjugated or impoverished in any ordinary sense.

These issues need to be viewed somewhat separately because, while satisfaction of the second demand tends to imply satisfaction of the first, the reverse is not true. Although the revolutionary fervor associated with the first issues could probably be reduced by offering economic gains and limited sharing power, the force of the second might still remain.

The first issue is a demand, by groups who feel subjugated, for emancipation; for potency in the society; for an effective voice in decisions affecting their individual destinies; for the right to feel a sense of self-worth; or for equal social, economic, and educational opportunity in a system that does not deprive them of meaningful participation because they are black, or students, or poor, or "culturally deprived." Among such groups are:

Blacks
Third World
Student, draft-age youth
Teachers
Labor
Women
Consumers
Homosexuals, sexual deviates
Marijuana smokers
Psychedelic drug advocates
Experimenters with marriage substitutes
Opponents of the Vietnam war
Welfare recipients and poverty groups
Minorities in general

These various groups do not have identical aims, of course. Nevertheless many of them find adequate common cause to be frequently seen in collaboration. (We do not mean to blur over the very real differences either—success has not crowned attempts to marry black, student, and labor groups. In addition, the groups vary considerably in the extent to which their claims for emancipation are recognized by, and trouble the conscience of, the dominant majority.)

The second issue is both a demand for person-centered values (and for institutional reform to that end) and a challenging of the values and the power of the "military-industrial-education complex."

In terms of values, this force represents a rejection of what we earlier described as traditional middle-class values, espousing instead what we called the "new" values. This group tends to define as immoral and bankrupt a national policy which is perceived as offering token reform at home and counterrevolutionary imperialism abroad. They point to a demonstrated inability of the present power structure to create a viable international order, ~~to cope~~ with environmental problems, to correct institutionalized and legitimated inequities, and to construct a high technology society which does not at the same time time affront and humiliate the human spirit.

ANALYSIS OF REVOLUTIONARY FORCES

In the remainder of this section, we propose to discuss contemporary revolutionary forces and their significance, using as our context the diagram in Figure 2. This diagram is an attempt to indicate various possible states of mind individuals may have with regard to felt need for action, and to note transitions that seem to have taken place as reflected in past events. The current situation of widespread civil dissidence will thus be viewed as involving numerous actors who hold various attitudes regarding desirable action to improve the lot of subjugated or underprivileged groups in the society or to effect societal and moral reform.

A major assumption of the diagram is that, as a result of a person's experiences, he may shift from one such attitude or state to another. Alternative policies may affect the probabilities of such shifts in different ways, and thus may contribute to the bringing about of alternative futures. With the aid of this framework, then, we will attempt to say something about the alternative future courses which events might take. We can only hope that the inevitable shortcomings of such a deliberately oversimplified model will be outweighed by its conceptual usefulness.

Let us now examine the diagram in detail.

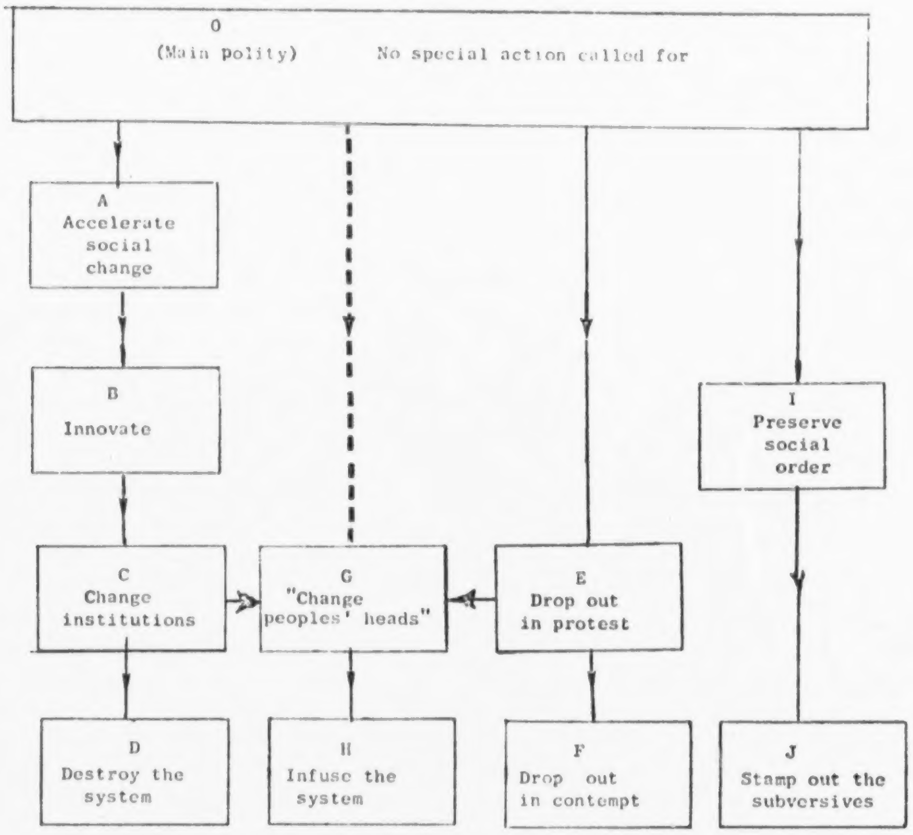
O
(Main polity) No special action called for
A
Accelerate social change
B
Innovate
C
Change institutions
D
Destroy the system
G
"Change peoples' heads"
H
Infuse the system
E
Drop out in protest
F
Drop out in contempt
I
Preserve social order
J
Stamp out the subversives

Figure 2

State diagram of premises involved in
contemporary revolutionary forces

Q. No special action called for.—The box at the top of the diagram represents the main body of the population, out of which the primary actors in the revolutionary drama are drawn. It comprises a wide range of positions along the dimension inert-unconcerned to active-concerned, and also along the dimension liberal to conservative. The basic premises are that no unusual actions are called for, progressive social change is taking place at a safe and appropriate rate, and normal political institutions and processes are adequate for the accomplishment of desirable change.

A. Accelerate social change.—Box A represents the state of having recognized serious inequities and inhumanities in the society and of having concluded that acceleration of social change is required. Implicit is the assumption that declared intentions are genuine and legitimated political actions are adequate to the needs.

Actions connected with civil rights issues involving persons with these premises included the rise of civil rights activity following Brown versus Board of Education (1954) from the Montgomery bus boycott (1955), forced integration of schools (1956 on), Southern lunch-counter sit-ins (1961), Civil Rights Act (1965). Persons of this attitude state were involved in the civil rights march on Washington (1963), the Economic Opportunity Act and the beginning of Community Action programs (1964), the Elementary and Secondary Education Act, and other portions of the war on poverty (1965). Clearly the actors in these cases included both members of the economically and socially underprivileged minorities and persons for whom the demand for societal and moral reform was a more idealistic one.

Student reactions to the Vietnam war, the draft, nonrelevance of higher education, etc., began mildly in the early Sixties—remember the apathetic Fifties?—gained momentum rapidly in 1964, and in a sense culminated in the youth-for-McCarthy campaign in 1968.

B. Innovate.—State B in the diagram represents the position that speeding up of processes underway is not adequate to the need, and innovation is required. Many students and minority leaders came to this position as a consequence of disillusionment over the failures of type A responses. These persons lost faith in the adequacy of normal political processes, and arrived at the conviction that new types of political actions would be necessary to awaken moral sensibilities and to generate response to the problems.

Among the significant tests of the system waged by persons embracing this attitude were the HUAC demonstration in San Francisco (1961), the Mississippi summer project and MFDP at the Democratic Convention (1964), the Mississippi antifear march and the shooting of James Meredith (1966), and the stop-the-draft demonstrations of 1967, particularly at the Oakland induction center and the Pentagon. Innovative political actions included the formation of SDS (with its initial emphasis on working with Congress) (1962), the Free Speech Movement (1964), initiation of experimental colleges and free universities (1966), NSA-sponsored tutorials for minority-group students (1963), and the first forms of black power (1966).

C. Change institutions.—State B turned out for many to be a transition state, leading to the conviction that present forms of institutionalized power are intrinsically inadequate to deal with the massive social problems of the day, and, thus, that the solution to social ills must come through radical change of institutional forms. Since awareness of this inadequacy is obscured by the ability of the Establishment to enculturate and to co-opt, it follows that confrontations and other radicalizing activities are necessary to bring about this awareness.

A subsidiary premise is that groups in power seldom share that power willingly. Hence, a group perceiving itself to be without legitimated power must fall back on coercion and at least the threat of violence to effect social change.

Among events involving persons of this persuasion were (1) the emergence (around 1967) of such major confrontation-instigating agencies as SDS, Black Student Unions, and the Black Panther Party; (2) major confrontations between students and police on campuses (1967–69) and student strikes (1968); (3) street people and police clashes over the peoples' park issue in Berkeley (1969); and (4) urban ghetto riots (1965–1968). Again, both the economically underprivileged and the disaffected privileged were involved, but with goals that significantly differed. (In terms of Maslow's need-concern levels, both deficiency-motivated and growth-motivated persons were involved, but their inner dynamics were different and at certain stages or on some issues they have parted company.)

The groups holding this radical premise comprise a wide range along the dimension of willingness to escalate the level of violence. This willingness depends, in part, upon the nature and severity of suppressive forces applied. The overall radical strategy has been made clear in the statements of radical leaders, and is simple enough in its logic. It is to continue to apply force, moving toward methods that are more and more economical of resources (in terms of losing fewer men to jail, hospital, and morgue) and more and more difficult to suppress. Thus, the canonical sequence moves from mass demonstrations, strikes, and riots, through sabotage, terrorizing, and urban guerrilla warfare, to the weapon of last resort—selective assassination. The extremist end of this sequence corresponds to state D, the real political revolutionary. However, many of the militants seem to be moving from this premise to state G, the psychological revolutionary. And we see some signs that severe repressive measures combined with little evidence of solid social change can lead many of this group to retreat into apathetic resentment, discouragement, and smoldering hate for the whole system.

D. Destroy the system.—The basic premise represented here is that the whole system is evil and has to be torn down. Whereas some persons of persuasions C and G feel that the threat of destroying the system is necessary therapy to jolt people into awareness, this group means it. This point of view is represented by the positions of the Progressive Labor Party, by various Marxist, Castroist, and Maoist groups, and by extremist anarchist nongroups. It is patently true that the overall revolutionary movement is not solely Communist inspired in its origin; to exaggerate the contribution of subversive exogenous agents is as serious an error as to assume that they are not present at all. However, it is equally true that elements of the movement are closely allied with the international radical left.

E. Drop out in protest.—Another revolutionary attitude represented in the diagram stems from the basic premise of the possibility of expanded consciousness. It becomes nationally significant in 1963 with the foundation by Harvard's Timothy Leary of the International Foundation for Internal Freedom (IFIF), promulgating the ethic "turn on, tune in, drop out." This psychochemical beginning led to the hippie phenomenon; widespread interest in Eastern philosophical religions and meditative practices; psychedelic light shows, rock music and lyrics (with rock radio stations as a worldwide communication network carrying the revolutionary message); black-market drugs and the psychedelic movement in the name of religious freedom; hippie dropouts, love and flower power, sexual freedom, and the establishment of communes.

F. Drop out in contempt.—Some members of group E, with their newfound expanded awareness, took a good look at what man was doing to man in the social system, and moved from a position of drop out in protest to one of drop out in contempt. With this viewpoint are often associated libertinism and unrepressed sensuality, flaunted hedonism, and general rejection of work, discipline, and conventional social amenities. Although the members of this group have removed themselves from the field of action, they are of concern both because of the loss of human resources they represent, and because they tend to become associated with drug abuse and related crime.

G. Change peoples' heads.—Not all of the turned-on generation, however, view the dropout as the desired permanent state. Rather, for some of the dropouts it became more like the withdrawal and return of Toynbee and Jung. These persons tended to re-enter society with a new political awareness, joining forces (state G) with some of political activists who were turning on to the conviction that the real revolution is not in the ghetto or on the campus, but in peoples' heads, and that without inner change, institutional reform alone will not bring necessary changes.

Here they find common cause with another group whose members sometimes refer to themselves as the human potential movement (represented by the dotted line in the diagram). If one wanted to pick a date for the beginnings of this component, the initiation of the Esalen Institute programs in 1961 would be as suitable as any. From these beginnings at Big Sur the movement has grown to include well over a hundred growth centers and free-university programs, and thousands of psychotherapists, sensitivity training and psychodrama group leaders, sensory awareness teachers, yoga teachers, and assorted gurus.

Thus, the basic premise associated with this state is that necessary social change will come about only through widespread person-changing. To this end, its proponents have developed and use a person-changing technology as indicated in table I. Emphasis is on a dual awareness (a) of the higher-consciousness nature of man and of the bankruptcy of the scientific-technocratic and behaviorist views of man, and (b) of institutionalized inequity and inhumanity in the social system. The techniques near the top of the list in table I tend to aim more at expanded self-awareness, and those near the bottom at heightened social awareness.

TABLE I

Elements of person-changing technology	*Typical outcomes*
Meditation; yoga; psychedelic drugs; hypnosis; autohypnosis; and psychosynthesis.	Awareness of spiritual dimensions, of transcendental self, of the hypnotic or encapsulated nature of ordinary life.
	Sensitivity to feelings and emotions, beauty.
Self-awareness exercises; psychotherapies; group therapy.	Sensitivity to human closeness, self-honesty, realization there is nothing to hide.

Sensitivity training; encounter groups; gestalt therapy; and group nudity, marathons.	Spontaneous response to experience, self-expression, individual autonomy, emotional freedom.
Psychodrama	Removal of guilt and fear stemming from early training regarding morality and sin.
Synanon games; new theater (ridicule of establishment, crudity and nudity, audience encounter); forceful disruption of normal social process; underground press, and radicalizing confrontations.	Ego-reducing experience, awareness of ego-defense nature of social institutions and customs.
Deliberate provocation of instructive encounters such as police confrontations, black-white confrontations, etc.	Perception of oppressive nature of social institutions.

H. Infuse the system.—The number in this state is small but apparently growing. The basic premises are similar to *G*, with the additional premise that the best way to get radical change is to carry on a subtle revolution, that is, while dressing and acting conventionally, to infuse the system and to be in the world but not of it.

I. Preserve social orders.—The rapid rise of revolutionary thought and action in the last decade, particularly among the nonwhites and the youth, has caused a considerable fraction of the polity to conclude that special action is called for to preserve the social order. In particular, the existence of states D and F is seen as constituting a serious social problem, requiring some sort of counter response from the system.

J. Stamp out the subversives.—Some who may once have held similar opinions to I have moved on to the premise that all of these revolutionary views from B through H are subversive, anti-American, and must be stamped out. The right-extremist groups are exemplars of this position.

ALTERNATIVE OUTCOMES

This rather extended analysis of revolutionary forces, and of what might at first look seem to be but one of many indicators of future trends, has seemed justified because it is here that the forces shaping the future are focused. The issue in the revolutionary activity is the future. If the insurrectionist forces are seen by the populace and its elected representatives essentially as lawbreakers attempting to gain by coercion that which should properly be obtained by legitimate processes, the tendency will be simply to suppress them. If, in addition, a large dissident fraction of the polity persist in making demands for reform which they consider to be legitimate, this could lead us a long way toward a garrison-state kind of future in which a partially armed militant minority (consisting possibly of elements of militant blacks, other non-white groups, far-left labor, and idealist youth) is held in check by the overwhelming power of the military state.

Another possible sequence of future events is a period of disruptive violence followed by a restructuring of social institutions to accommodate a new power balance. This would be a course of events somewhat similar to that of the labor movement of 50 years ago. The establishment (management and owners in the earlier case) perceives the demand for sharing of power as illegitimate and threatening. They make attempts at token sharing that delay confrontation, but in the end fail to satisfy the developing radical consciousness. The outs increasingly resort to force and violence, and the ins continue to counter with limited force. It becomes apparent that the rising tide of expectations and demands is not going to go away. Furthermore, the outs have the power to disrupt and incapacitate industries, social institutions, and social processes in general to any degree they deem necessary as long as their numbers remain significantly large—and the repressive force limited. Thus, with the only other alternative being massive repression, which is unacceptable to the populace, the establishment is forced to accept the dissidents' demands for shared power. Social inventions (unions, collective bargaining techniques, etc.) are worked out to implement the new power balance. A consensus emerges that the new shared-power arrangement is workable and even seems more in line with our declared national and cultural values than was the previous arrangement.

One version of this latter future history would be characterized by the buying off of students by granting them some measure of power, and of minority groups by providing a measure of equality and security, thus thwarting or postponing the threatened revolution. That is to say, the major changes demanded by the revolutionary forces might be relinquished if enough secondary prizes were offered. This might leave the social, political, and economic structure of the nation relatively unchanged—at least, temporarily.

On the other hand, a point of view more or less represented by state G in Figure 2 might ascend to dominance. In brief, this is the position that the present revolutionary agitation is in direct line of descent from the American Revolution, whose central aims were the securing for the individual of (a) representation in the making of decisions which affect his destiny, and (b) freedom to pursue self-fulfillment in ways that do not result in others being deprived of the same right. In the same line of succession is the social-reform component of the labor movement. In this view, the contemporary revolutionary forces tend to be seen as essentially an accompaniment to a drastic evolutionary jump which society, and perhaps man himself, are attempting to make. If indeed this interpretation comes to dominate, then national policymakers will tend to use the opportunity provided by the militant pressure to accelerate progress toward the basic goals implicit in the founding of the Nation, while continuing the necessary suppression of violence and of infringement of others' rights. A development which makes this course of history fairly likely is discussed in the next section.

The preceding discussion is based on a number of analyses of current social discomfort, as listed in the bibliography. The months ahead will undoubtedly bring numerous additional studies which may fit into the framework presented here, or may furnish new or alternative insights. To whatever extent figure 2 stands up in the light of further data, it may furnish a useful basis for comparing alternative policy choices. It is evident, for example, that partial views of these complex phenomena may lead to policies which drive individuals into states D and F (and hence build up the population in state J); other policies based on a more complete understanding might encourage movement toward states G and H.

However, the most important proposition emerging from these analyses is that the unrest appears to comprise a superposition of two quite dissimilar phenomena. One is a current version of the class warfare, significantly aligned along color lines, which has been characteristic of human civilization throughout history. The other phenomenon is uniquely a product of our high degree of technology and industrialization. This is the revolt of middle-class youth against middle-class values and the technological society. Clearly it would be a great error to ascribe this second component of the disquiet to an international leftist conspiracy, or to interpret it simply as pampered youth challenging the authority of their elders. Rather, it is more accurately seen as a symptom of a much more fundamental malady of the entire society. Youth feel a sense of powerlessness arising out of the realization that we have somehow lost control over our gigantic, Frankensteinian, technological-industrial machine. They know that they can count on a fair measure of material comfort and security; they find little of value in their promised place in the bureaucratic-technological society, where their talents will be exploited for the ends of the Big Machine. They sense that the society is on a collision course with real trouble, and that nothing short of a drastic shift in the implicit values and the organizational structure of the technological society will avert disaster. These two components, the perennial class warfare and the singular great dissent, each have their own separate dynamics. Bad policy choices can result from taking only the first to be real, explaining away the second as an idiosyncrasy of the younger generation.

The analysis of current social unrest is vital to consideration of education's future roles. Not only does its fuller understanding give some clues as to the kind of future we may have to design education for. It also faces us squarely with the question of the kind of future education is to help bring about.

In the next section we shall examine a current which runs deeper still, and which may be in an even more fundamental sense an important part of the new youth dynamic.

VI. A Possible Underlying Conceptual Revolution

Political revolutionaries and struggles of subjugated groups to redress the power balance are not new in history. (The psychological revolutionaries we examined in the last section are less familiar.) Likewise, cultural history records many instances of changes in values over time. Here and there in the literature on the future—i.e., in Platt (1966), Boulding (1966), Teilhard de Chardin (1959), Mumford (1956), Matson (1964), and Becker (1969)—we find suggestions that something much more infrequent in the history of man may be taking place, a major conceptual revolution.

Indeed, this phenomenon is so rare that one could argue that only once in the history of the Western world since Christianity rose to provide the first unified Western thought has there been a drastic shift in dominant, basic premises—namely that associated with the Protestant Reformation. Max Weber and his followers in sociology have contended that when a significant change occurs in a society it is the whole sociocultural system which changes, including institutionalized organizational forms, roles, norms, traditions, values, and basic belief premises. Thus, related to the belief-and-value shift from the theological view of the Middle Ages to the Protestant ethic and economic view of the modern Western World were, it is claimed, such social changes as the rise of modern corporate capitalism, the industrial revolution, and the subsequent explosive growth of technology.

There do seem to be superficial parallels, at least, between events of the past decade and those of the 16th century. That period, too, was one of multiple revolutions:

The Protestant revolt with its anabaptist groups reminiscent of modern student protest groups;
The challenge of a new economics in the rise of capitalism;
The beginnings, with Copernicus, of the scientific revolution;
A revolutionary age of exploration and discovery;
The commercial and price revolution—rearrangement of social classes, redistribution of wealth, and urban growth;
Redistribution of authority—political centralization and nationalism, substituting secular for religious authority; and
Technological revolution (the printing press).

If, indeed, the contemporary manifold evidences of revolutionary ferment are related to a shifting in dominant belief-and-value assumptions within the culture, such a shift may well bring as pervasive and varied changes in the society as accompanied the rise of the Protestant ethic.

EVIDENCES OF A SHIFT IN BASIC-ASSUMPTIONS

The evidence we shall examine briefly indicates, first of all, an increased tolerance in the popular culture for belief systems which tend in the metaphysical or transcendental direction, in contrast with the agnosticism and skeptical materialism of the post-World War I period. Secondly, it indicates an opening up of the basic presuppositions within science to allow conceptual models not limited by the positivistic premise.

Aldous Huxley (1945) was one of the first modern writers to suggest that an age-old set of basic assumptions about the nature of man was showing new strength. We shall borrow his term, the perennial philosophy.

> *Philosophia Perennis*—the phrase was coined by Leibniz; but the thing—the metaphysic that recognizes a divine reality substantial to the world of things and lives and minds; the psychology that finds in the soul something similar to, or even identical with, divine reality; the ethic that places man's final end in the knowledge of the imminent and transcendent ground of all being—the thing is immemorial and universal. Rudiments of the perennial philosophy may be found among the traditionary lore of primitive peoples in every region of the world, and in its fully developed forms it has a place in every one of the higher religions. A version of this highest common factor in all preceding and subsequent theologies was first committed to writing more than 25 centuries ago, and since that time the inexhaustible theme has been treated again and again, from the standpoint of every religious tradition and in all the principal languages of Asia and Europe.

The basic proposition of the perennial philosophy is an experimental one, that man can under certain conditions attain a higher awareness of cosmic consciousness, in which state he has immediate knowledge of a reality underlying the phenomenal world, in speaking of which it seems appropriate to use words as infinite and eternal, Divine Ground, Brahman, Godhead, or Clear Light of the Void. From this vantage point, one's own growth and creativity, and his participation in the evolutionary process, are seen to be under the ultimate direction of a higher center (Atman, the Self of Vedantic writings, the Oversoul). Ordinary perceptions of one's life and one's environment are likened to the perceptions of a hypnotic trance. Such phenomena as extrasensory perception, precognition of future events, levitation and other psychokinetic events, instant diagnosis and healing, etc., are only extraordinary, not a priori impossible.

The basic assumptions of positivistic science and relationship to the perennial philosophy much as Newtonian mechanics relates to relativistic physics: They are in no way invalidated for those aspects of human experience to which they are appropriate, but comprise a special case, a limited form of the more general theory. Similarly, the philosophies of materialism and idealism are to each other as the wave and particle theories of light and matter; each fits the world as seen with a particular mode of observation, and a complementary relationship holds between them.

Of course the perennial philosophy is not new to Western culture. It is present in the Rosicrucian and Freemasonry traditions. Its symbolism in the Great Seal of the United States, on the back of the one-dollar bill, is testimony to the role it played in the formation of this country. It also appears in the transcendentalism of Emerson, the creative evolution of Bergson, and the extensive writings of William James.

Whether one ascribes its recent popularity to increased intellectual openness and tolerance or to anxiety brought on by the nuclear threat, indications abound that increasing numbers of persons seem to be taking its premises seriously. Rising book sales in religion, metaphysics, transcendental philoposhy, eastern religious philosophies, and parapsychology indicate growing interest in these related areas. Contemporary song lyrics—e.g., the rock music of Dyland, Donovan, and the Beatles; the recent Age of Aquarius; and the melodic On a Clear Day (rise and look around you, and you will see who you are)—contain numerous subtle and not-so-sutble references to perennial philosophy viewpoints. Metaphysically oriented churches, societies, and study groups are much in evidence. Courses and lectures on eastern religious philosophies are well attended in the free universities, the 100 or more Esalen-type growth centers, university extension courses, adult education courses, etc.

Part of society's thus far negative reaction to monistic and eastern kinds of beliefs as they have appeared in the hippie culture, the drug scene, and numerous cults, has been due to the fear that they would lead to quietism and withdwaral and, therefore, would undermine the social structure. Although it is true that these beliefs have been associated with the eastern world, there is in fact nothing in the perennial philosophy premises which is contrary to virile and active participation in economic and political affairs. Neither are these premses in any way contrary to a high-technology society; they only say something about the ends to which that technology would be put. The kind of society which Erich Fromm talks about in "The Revolution of Hope," or John Galbraith in "The New Industrial State," or Michael Harrington in "The Accidental Century" is completely compatible with the perennial philosophy premises. Such a society would, with all its high technology, tend to be education- and growth-centered. Its' education would, like the Greek ideal as described in Werner Jaeger's "Paidea," place high emphasis on the search for the Divine Center.

BEGINNINGS OF A NEW SCIENCE

Even more important than indications of a shift in the attitudes of the public at large, which by itself might appear to be a mere fad, are indications that scientists—persons with recognized scientific training who are on the staffs of research organizations and universities with high standards and who hold membership in recognized scientific associations—are manifesting more and more interest in developing a science of ordinary and extraordinary subjective experience. The study of altered states of consciousness is not completely new, of course. The phenonomena of hypnosis have been studied in a scientific way, off and on, for at least a century and a half. Phenomenology has been a sporadic influence in psychology. Freud's psychoanalysis and its offshoots have attempted to probe the unconscious processes.

Many of the pioneering works in this area have assumed the appropriateness of premises akin to the perennial philosophy, e.g., F. W. H. Myers' Human Personality and Its Survival of Bodily Death, Richard Bucke's Cosmic Consciousness, Pitirim Sorokins' The Ways and Power of Love, not to mention the writings of numerous Vedanta, Sufi, and Zen scholars. Among modern psychotherapists whose works fit into this same basic philosophical framework are C. G. Jung, Roberto Assagioli, and Hubert Benoit.

New scientific journals implicitly friendly to the perennial philosophy premises include the Journal of Transpersonal Psychology and the Journal for the Study of Consciousness. At the popular level, we have the new and glossy Psychic, a magazine devoted to every aspect of psychic phenomena and related topics.

Research activity is currently significant in at least three approaches to altered states of consciousness: Feedback of EEG signals, psychedelic chemicals, and classical (by which we mean sensory deprivation, yoga, autophynosis, hypnosis, meditation, etc.). It should be noted that there are two recent and significant advances in this area. One is increased access to and control of diverse states of consciousness making them more available for exploration. The other is the appearance of physiological correlates to altered states (EEG, EMG, GSR, REM, etc.). This latter is of extreme importance in a philosophy-of-science sense. The scientist of subjective experience is now much more in the position of the physicist studying an electron, or the astronomer studying a galaxy, in that he can say, "Here is a phenomenon (dream, satori state, etc.) which defies strict definition, but which I can study through various correlates (alpha waves, rapid-eye-movement, verbal report, observable behavior, etc.)." In effect, it means that the barrier between objective, "public" data and subjective, "private" data is gone for good, and the legitimated boundaries for scientific scrutiny are thus extended.

CHARACTERISTICS OF THE NEW SCIENCE

The science of man's subjective experience is in its infancy. Even so, some of its foreshadowings are evident. With the classification of these questions into the realm of empirical inquiry, we can anticipate an acceleration of research in this area. Consequently, there is new hope of consensus on issues—especially value issues—which have been at the root of conflict for centuries (just as earlier there came about consensus on the place of the Earth in the universe, and on the origin of man). The new science bids fair to incorporate the most penetrating insights of psychology, the humanities, and religion. These developments will have profound impacts on goal priorities in society, on our concepts of education, on the further development and use of technology, and perhaps (as in the case of the Copernican revolution) on the distribution of power among social institutions and interest groups.

Young and incomplete as the science of subjective experience is, it nevertheless already contains what may very well be extremely significant precursors of tomorrow's image of man's potentialities. Space does not permit documenting them here;[1] however, the following three *propositions* have accumulated an impressive amount of substantiating evidence:

> The potentialities of the individual human being are far greater, in extent and diversity, than we ordinarily imagine them to be, and far greater than currently in-vogue models of man would lead us to think possible.
>
> A far greater portion of significant human experience than we ordinarily feel or assume to be so is comprised of unconscious processes. This includes not only the sort of repressed memories and messages familiar to us through psychotherapy. It includes laso "the wisdom of the body" and those mysterious realms of experience we refer to with such words as "intuition" and "creativity." Access to these unconscious processes is apparently facilitated by a wide variety of factors, including attention to feelings and emotions, inner attention, "free association," hypnosis, sensory deprivation, hallucinogenic and psychedelic drugs, and others.
>
> Included in these partly or largely unconscious processes are self-expectations, internalized expectations of others, images of the self and of the limitations of the self, and images of the future, which plan a predominant role in limiting or enhancing actualization of one's capacities. Such images and expectations tend to be self-fulfilling. (Much recent research has focused on the role of self expectations and expectations of others in affecting performance. Research findings are buttressing the intuitive wisdom that one of the most important characteristics of any society is its vision of itself and its future, what Boulding calls "organizing images." The validity of the self-fulfilling prophecy and of the self-realizing image appears to grow steadily in confirmation.)

Assuming that the evidence for these propositions continues to mount, substantiating them and supporting their further extension, they will have the most profound implications for the future.

RELATION TO REVOLUTIONARY FORCES

The real significance of a science of subjective experience and "altered states of consciousness" is that it is in this area that our individual and social values are experientially and historically rooted. The development of such a science would redress what in retrospect is a puzzling discrepancy between the audacity with which man has pursued the physical, biological, and social sciences, and the timidity with which he has contemplated the possibility of developing a moral science. Already in the field of clinical psychology several scientists are proposing a formulate through their researchers "a natural value system, a court of ultimate appeal for the determination of good and bad, of right and wrong" (A. H. Maslow), with "universal human value directions emerging from the experiencing of the human organism" (Carl Rogers). What may be in the offing may be a new means of obtaining consensus on value questions, by submitting them to the test of what is ultimately wholesome for the whole man.

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[1] See W. W. Harman. "Belief systems, scientific findings, and educational policy," EPRC Research Note No. 6747-4, Stanford Research Institute, November 1967.

As previously noted, young peoples' concern with "awareness-expanding" and "consciousness exploring" activities is intimately related to their own reformulated value convictions. Such explorations have tended to lead to espousal of the Perennial Philosophy, with its strong affirmation that individuals do make a difference, and that values do have an eternal base. These convictions in turn reinforce demands for a person-centered, rather than establishment-centered, education, and for a society adapted to transcendental (or at least humane) man rather than economic man.

If materialism was the philosophical base for the Old Left, it appears that transcendentalism may be coming to serve the New Left in a similar role. The revolutionary press intersperses, among its' political discussions and diatribes against various aspects of the social system, articles on Eastern philosophies, hip drug use, the human potential movement, transcendental meditation, and Krishna consciousness. On the other hand, COSMOS, the monthly newspaper of "the occult, psychic phenomena, spiritualism, ESP, metaphysics, New Age philosophies, and allied subjects," publishes articles on the youth revolution, the crisis in values, the generation gap, and social injustice. The far-flung network of "rock stations," broadcasting revolutionary messages in the lyrics of their songs and in their parodies of news programs, also carry interviews and lectures relating to religious, metaphysical, psychic, and esoteric topics, and as a public service, announce the meetings and fund raising campaigns of religious study groups, Subud, Scientology, Vedanta, and assorted similar organizations. In his penetrating analysis of the youth revolt, Roszak (1969) admits that the new religious outlook of the young tends to be "a phantasmagorial of exotic religiosity. . . . If one scans any of the underground weeklies, one is apt to find their pages swarming with Christ and the prophets, Zen, Sufism, Hinduism, primitive shamanism, theosophy, the Left-Handed Tantra. . . . At the level of our youth, we begin to resemble nothing so much as the cultic hothouse of the Hellenistic period, where every manner of mystery and fakery, ritual and rite, intermingled with marvelous indiscrimination." Notwithstanding, he notes, there is a unifying theme. "The world view of Lao-Tzu, of the Buddha, of the Zen masters . . . has become one of the strongest strains of the counter-culture. . . . The counter-culture is, essentially, an exploration of the politics of consciousness" (pp. 83, 140, 156).

It is obviously too early to tell whether the shift in operating values and basic premises, as we have described it, is taking place in a lasting way. If it does, we may expect to see as radical changes in the sociocultural system as when the belief system of the Middle Ages gave way to the Protestant ethic and capitalistic economics. If such a shift takes place, it would tend to support the "person-centered society" described in Section III and the "new values" and "American origin" values as summarized in Section IV.

VII. META-ISSUES OF THE FUTURE

Thus far, we have examined manifest trends and countertrends, and have examined several aspects of the alternative futures among which we, as a society, are in the process of choosing. We have argued that, in a fundamental sense, choosing the future involves choosing a set of beliefs and values to be dominant. Because the current issues in the dissidence of youth and minority groups may be assumed to be indicators of the choices with which the society is faced, we examined these in some detail. Various bits of evidence pointed to the possibility of a conceptual revolution in process, and we looked at those.

We are now, at long last, ready to look at what we might be able to summarize out of all of this that is directly relevant to educational policy. Let us, first of all, introduce a useful concept for our discussion, "choice point." By choice point is meant a point or period in time when the society as a whole makes a commitment of psychic, human, and economic resources in a particular direction. The associated decisions are multifold and are diffused in level (political, institutional, and value-belief), in time, and in space (some in Washington, some in other capitals, some in Wall Street, etc.). Some are made with awareness; others may be made by default, or with relative unawareness of making any decision at all. The choice is not necessarily associated with a major decision of any one identifiable agency, but is rather an aggregate of decisions made more or less simultaneously (in the long-term historical sense) by different elements of society. An example would be the choice to provide some sort of old age security, which reached its present form as a consequence of numerous State and Federal laws and amendments, and a host of less identifiable decisions by unions, committees, employers, etc.

In the preceding discussions we have argued that the society is presently involved with such a choice point, in moving either toward what we termed the second-phase industrial society or the person-centered society. It is obvious that no one in the White House or anywhere else will actually make such a decision. But in effect, through a multiplicity of decisions ranging from Congress and the Pentagon to the local school board and industrial management, the choice is in process of being made. At one level a component decision may have to do with pollution of a local river, at another with the structure of regional government, at another with the values inculcated in the schoolroom. The form of future education will be much affected by which way this choice is eventually made. On the other hand, educators themselves have the opportunity to affect this choice, at least in part. For, just as the beliefs and values of a society determine the kind of educational system it chooses to set up, so does the educational system affect what beliefs and values are either perpetuated or changed.

An important component of this choice rests in the decision of how to handle the current forces of political dissent and insurrection which exist particularly among our youth and minority groups, since the issues posed by these groups are in considerable measure these same issues. The possibility of a conceptual revolution, which we examined in section VI, is also involved in this choice, and as we have also seen, is intimately connected with the youth revolt. In addition, we showed that the premises of the perennial philosophy are compatible with the person-centered society, although not demanded by it.

Now let us look at the changes in society one more way before summarizing how all of this relates to education. From all of the trends and alternative futures and revolutionary issues there emerge some meta-issues, or issues behind the issues. We shall single out four. These meta-issues may seem to be at the level of questions about the nature of the good life and the good society. And indeed they are. But they are also implicit in such questions as what shall we do about local control of schools, drug use in high schools, student rebellion over school rules, sensitivity training, black studies programs, the role of vocational education, the quality of ghetto schools, new career ladders for minority-group teacher candidates, and person-centered curriculum. Indeed, the choice the society as a whole makes on these meta-issues will determine in considerable measure what courses the schools will be free to take on the more specific issues.

Thus, far from being theoretical and impractical, these meta-issues are the important ones to keep our eyes on. We select four as being among the most crucial. We shall label them as four crises, using the word in its root meaning as a turning point, recognizing that they may not seem to merit the connotation of emergency which is often associated with that word. But these issues are the keys to the unsolvable macroproblems of section II. The four we identify are, then, a crisis in human image, a crisis in authority, a crisis in economic values, and a crisis in pluralism.

THE CRISIS IN HUMAN IMAGE

We have already noted, in discussing the possible conceptual revolution, that a conflict exists between the basic premises of a democracy—that man is, by virtue of his transcendental nature, endowed with reason, will, and a valid sense of value—and the reductionistic, deterministic, and physicalistic premises of the behavioral science, sociopolitical theory that our universities impart to their annual crop of budding sociologists and political scientists.

The young social scientist receives a background in a sociology which has shifted from its earlier emphasis on the semiphilosophical humanities approach to an emphasis on techniques and empirical studies, with the implication that man is a creature of his drives, habits, and social roles, and in whose behavior reason and choice play no decisive part. In the courses he is offered in psychology this point of view is likely to be made even more explicit, with consciousness considered to be an inconsequential accompaniment to behavior governed by external stimuli and instinctive urges. His politcal science tends to focus on the processes by which public policies are made, and to be relatively little concerned with their contents. Amid the measurement of attitudes, population movements, organizational trends, and political behavior, and the modeling of society and governments, little attention is given to the historic questions relating to man, his condition, and his destiny.

On the other hand, the concept of a transcendental, choosing, ultimately responsible self is essential to the entire theory of democratic government. It underlies the assumption that the criminal is responsible for his act (while recognizing in providing rehabilitation opportunities that his antisocial traits may have their roots in environmental conditioning). It is basic to the assumption in the judicial process that the judge can meaningfully make a normative judgment. Matson (1964) has given a particularly cogent analysis of the consequences of overemphasizing the objective perspective in political affairs (as contrasted with a complementary relationship between objective and humane perspectives).

Drucker (1939) was one of those who early rose to sound the demise of the image of economic man:

> The belief in the desirability and in the necessity of the sovereignty and autonomy of the economic sphere is disappearing; and with the belief, the reality . . . It is the characteristic feature of our times that no new concept lies ready under the surface to take the place of Economic Man.

As we noted earlier, such a new image may be emerging now.

Mendel (1969) speaks of the youth rejection of the economic man image as:

> The Great Refusal against that pitiful caricature of man created by five centuries of urban, technological, and scientific progress—*homo economicus*. The essential accusation of the Great Refusal is directed against the subordination of human experience to the economic processes of the consumer society and its increasingly more absurd products, to the aggressive militarism that at least in our case has become so tightly interwoven with this society, and to the gigantic, impersonal organizations through which it all functions.

The ramifications of this conflict go much further than has been indicated so far. The kind of educational system and educational goals a society sets up, the way it handles the problem of poverty, the priorities it gives to aesthetic considerations, the extent to which it considers its citizens' need for easy access to communion with the nature, the uses of leisure it fosters—all these aspects and many more are effected by the image of man held by the society. Currently in our society a potent emerging force pushes for a change in that image, in the direction of transcendent man; but thus far the power is on the side of reductionists.

THE CRISIS IN AUTHORITY

If the issue of the image of man is crucial but unobtrusive, the issue of authority is immediately and obviously before us. We have witnessed in recent decades the hastening erosion of the authority of the parent, the teacher, the scholar, the church, the law, and the state. Today's youth deeply question the meaning of the Nation's policies and apparent aims. We need only to remind ourselves of the change, within a generation or two, in the connotations of the military uniform, the American flag on foreign soil, the policeman's badge, the draft card, and patriotism.

This issue is, essentially, one concerning the balance between authority based upon power and authority based upon voluntarily given respect. The central fact of our day is that a significant fraction of the population, largely blacks and youth, have concluded that established authority on national and local levels is illegitimate—that is, it does not adequately represent their interests, and it is not based on trust, nor on a general consensus.

Varied is the speculation as to how this erosion of legitimacy of authority came about. Flacks (1969) listed and analyzed its possible origins and correlates; his list plus a few others from other sources includes:

Widespread decline of commitment to "middle class values" and to the capitalist ethic, while political and institutional elites continue to represent themselves in those traditional ways;

Rapid growth of a sector of the middle class whose status depends on high education rather than property, and who tend to be critical of traditional capitalism and skeptical about the sanctity and benevolence of established authority;

Child rearing practices by that group, and by significant minority cultures, which have cultivated doubts about established authority;

Extension of education, leading to increased feelings of competence, self estem, efficacy and potency, which in turn emphasizes self esteem, efficacy and potency, which in turn emphasizes self awareness rather than socialization as a suitable guide to behavior;

Transformation of the American family in the directions of greater equality, encouragement of self-expression and autonomous behavior, and fewer parental demands for self-discipline,

The prohibition experience in particular, and more generally, widespread disregard of laws restricting private sexual behavior and other sumptuary laws;

Stringent punitive laws regulating marihuana usage, while such usage is considered by a rapidly increasing minority (adults as well as youth, teachers as well as students) to be a desirable substitute for the cocktail (a repetition of the prohibition experience);

Increased distrust by Negroes arising from liberal promises which they view as unkept, and from experiences which repeatedly reinforce their conviction that the system is biased against them:

Harassment of blacks and hippies by police,

Reaction to the unpopular draft and to the "immoral" Vietnam war;

Specific incidents of dishonesty (e.g., 1959 television quiz show scandals, Eisenhower denial of U-2 spying, Stevenson U.N. denial of Bay of Pigs plans); and

Lowering of faith in integrity of scholars and scientists (because of university involvement in military research, quantification and dehumanization of the social sciences, misinformation they have provided regarding marihuana and LSD).

Flacks provides several generalizations about the problem of maintaining the legitimacy of the authority structure:

Individuals tend to attribute legitimacy to authority when the exercise of that authority is perceived as beneficial to groups, individuals, or values to which that individual is committed. Legitimacy tends to be eroded if members of minority subcultures experience a persistent pattern of inequity, or if groups perceive significant discrepancies between their goals and those of the larger society.

Attribution of legitimacy is a function of trust, which in turn depends upon such matters as the objectivity of the authorities in mediating conflicts, the implementation of equality before the law, the openness of the political system to dissenting views, the trustworthiness of statements made by national leaders, and the degree to which officially espoused policies are actually implemented.

Individuals tend to attribute legitimacy to authority if they perceive a generalized consensus supporting legitimacy.

A person's sense of competence, potency, efficacy, is related to his response to different kinds of authority. Persons with a low sense of competence will tolerate authoritarian power; for those with high competence the legitimacy of authority depends on the degree to which they have access to the decision-making process, or believe that their judgments are taken seriously by their superiors, or have the freedom to shape their own situation, without reference to higher authority.

These considerations suggest that the restoration of the image of America as a provider of moral leadership and as an advancer of civilization, and the development of a sense of legitimacy of established authority, are among the most urgent national educational tasks of our day. They are tasks not just for the schools, but for the law enforcement agencies, for the political leadership, and for policy as a whole.

THE CRISIS IN ECONOMIC VALUES

We have discussed this earlier so it requires only brief mention here. The essential issue is the extent to which economic values shall be deemphasized, and values which are *non-economic*, at least in the strict sense, shall be a part of our operative (as contrasted with declared) values. The issue is central to resolution of the revolutionary forces. It becomes specific in spelling out the goals for program budgeting, or listing the benefits in a cost/benefit analysis, or evaluating achievement of educational objectives, or deciding what kinds of educational experiences shall be offered out of public funding, or planning for continuing education. If one is persuaded that education has any effect at all in changing values, the issue becomes a crucial one for the schools: What values shall be fostered?

THE CRISIS IN PLURALISM

A simple society can have a single culture; a complex civilization such as the United States cannot. Thus, the question is not whether we shall have a multimodal culture with a variety of behavior patterns and norms in different socioeconomic, educational, religious, and ethnic groups—no doubt we shall. Rather, the real question is whether we shall have mutual hostility and exploitation of weaker groups by stronger ones, or we shall have mutual respect and cooperation between diverse groups.

In a recent essay entitled Psychology and the Social Order, Lawrence Frank wrote about the challenge of this issue as follows:

> A social order which tolerates such wide-ranging pluralism of norms must seek unity through diversity. This means recognizing and cultivating differences while simultaneously enlisting people's loyalty and allegiance to a core of conduct and relationships. Only education and persuasion, not force, can build a social consensus out of these massive and varied elements . . . Social change and improvement must come through the concert of a population composed of individual personalities . . . instead of relying chiefly upon legislation, as in the past, we (must) begin to think how each person may become self-consciously aware of his role as a participant in his social order.

The issue of pluralism with respect to subculture arises in the educational world most directly over such specific questions as Black Studies programs and community control of schools. In broader form it lies behind the issues in teacher strikes and student rebellions.

VIII. Implications for Education

We warned in the beginning that, no matter what the title of this paper might seem to suggest, we would not be predicting the future and deducing from that future what the schools should do. Rather, we said that it was our hope to provide a useful framework for thinking about the future as it takes form through the events of the present.

Thus, this last section is brief, attempting only to demonstrate how the considerations we have raised in the earlier portions of the paper bear on educational issues.

EDUCATIONAL GOALS

The basic issue for education is the choice of goals; all else follows this. What is it we are trying to do? But for this statement to make sense we have to be using the word choice in the sense we used it previously—a commitment of psychic, human, and economic resources in a particular direction. In that sense the choice is not necessarily what the society or its leaders may declare it to be. The choice is, rather, inferred from where the society puts its resources.

Let us move one step further and argue that the implicit choice of goals can be inferred from the outcomes. Few will want to go all the way with that statement, but it contains an important germ of truth. Evidence mounts that in multifold subtle and unconscious ways humans communicate more than they consciously mean to communicate, and influence events in ways they do not consciously intend. Classical examples are the Freudian slip and the self-fulfilling prophecy. Thus, if we find that the operations of the school system tend, in fact, to perpetuate class differences with overrepresentation of Negroes and Mexican-Americans in the underclass, we are forced to consider the question of whether this is not an inferred, if largely unconscious, intent.

This is mainly to say that the goals of the educational system are much more a function of the choices the society has made or is making, than they are a consequence of the declarations of educational leaders. When George Counts in 1932 issued the inspiring challenge, "dare the schools build a new social order?," an appropriate answer might have been, they can't. The social order can barely build new schools. On the other hand, if the society were to move in the direction of the person-centered society as discussed in section III, the educational system would undoubtedly bear great resemblance to that advocated by Counts and Dewey and G. Stanley Hall.

Looking at this issue in another way, we might say that choices of educational goals are made in the society on at least three levels. First, the society itself makes a pervasive choice regarding the overall direction of its movement (such as those discussed in sections III and IV). This choice tends to set the constraints on what, in the long run, will be fostered, tolerated, or opposed. A movement within the school system which is not aligned with the general drift of the larger society, for instance, is unlikely to persist. Secondly, the society makes a decision as to what tasks will be assigned to educational institutions and what tasks to others. For example, the fostering of socially desirable attitudes toward authority might be a task divided between educational institutions and law enforcement. The development of a wholesome self image in the child might be assigned in some proportion to the institutions of educations, religion and psychotherapy. These first two types of choices are made largely outside the educational institutions. Thirdly, then, choices are made within the resulting context as to what the more specific objectives shall be, with what priorities they shall be carried out (that is, what resources shall be allocated), and in what manner they shall be accomplished. These choices are determined partly within and partly outside of the educational institutions.

Thus, if the society moves more or less in the direction of the second-phase industrial society we can anticipate increased emphasis on the role of education as playing a major part in accomplishing social goals and alleviating social problems (poverty, racial discrimination, challenges to national prestige, environmental deterioration, etc.). There will be strong reliance on behavior-shaping approaches, involving the detailed specification of desired behaviors to be imparted by contingency management techniques. This work will be based on a sound behavioral-science infrastructure. The roles of evaluation and credentialling—that is, assessing suitability for the various vocational and professional tasks which the society requires for its functioning—will probably remain important. Continuing education, in the form of vocational retreading, will also have an important place.

On the other hand, to whatever extent the person-centered orientation becomes dominant in the society at large, this will be reflected in the schools. Goals will shift in the direction of placing more emphasis on students becoming effective thinkers and learners, developing inquiry and problem-solving skills, acquiring social skills, and developing emotional awareness and self identity. Attention will be diverted from achieving behavioral objectives to setting conditions for spontaneous learning—especially to fostering feelings of safety and trust, and freedom to explore and inquire, and to providing a responsive environment and directed challenges. Reduced emphasis will be placed on absorbing specialized information and developing specific vocational skills. Less attention may also be given to grading, credentialling, and otherwise labeling persons.

Michael (1968) argues that drastic changes in education are necessary if we are to be prepared for the future:

> We must educate for empathy, compassion, trust, nonexploitiveness, nonmanipulativeness, for self-growth and self-esteem, for tolerance of ambiguity, for acknowledgement of error, for patience, for suffering. In the first place, those social-aid roles, the roles that are meaningful because they relate a person to a person, require such capabilities. . . . The other reason for deliberately undertaking this kind of education is that those who will have the tasks of planning and leading must have a far deeper feel for and understanding of themselves as selves and as a part of other persons, other selves, than they usually do today. . . . Without such educated, sensitized, emotional resources, leaders will continue to be too rigid, too defensive, too remote from themselves and thereby from others to have the flexible and bold state of mind that will be needed to cope humanely and imaginatively with plans and turmoil, order and disorder. It will take special efforts indeed to enlarge the emotional underpinning of those who recruit themselves to use the social technologies needed to run a complex society (pp. 109–111).

Unfortunately, significant changes in education do not come as direct consequences of such rational arguments. Only when the whole society shifts, for whatever subterranean reasons, toward a less economic and more humanistic orientation, are we likely to see much shift in education toward the goals described in Michael's plea.

PLAUSIBLE EDUCATIONAL TRENDS

Thus we see that while there is considerable indication that educational goal priorities are changing, such a change is inseparably linked to more inclusive social metaissues. Let us comment briefly on various other possible educational trends which are described in the various writings on education for the future:

Expanding fraction of the populace involved in education, and an expanding fraction of the national income going to education. This will no doubt be true no matter where in the range of plausible futures we find ourselves heading. The nature of that education, however, will be vastly different depending on whether we head for the person-centered society, the second-phase industrial society, or a period of violence followed by a garrison state.

New conscious role for education to play a major part in accomplishing social goals and alleviating perceived social problems (national prestige, poverty, social order, racial conflict, etc.). This, again, will probably be true whichever future we select, but what the social goals are, and what role will be played (e.g., maintaining social class differences vs. accelerating social mobility) will vary.

Increasing involvement of education with, and functional relationship to, other social institutions. The balance between this trend and the counter-trend toward autonomy and community control of schools, diversity and free choice among schools will be much influenced by how values shift.

Extension in duration of the educational period, both through early-childhood education, and through more education for adults, in the form of post-secondary schooling, vocational retraining, continuing education, parent education, and family education. Again, the overall trend is probably to be expected for any of the plausible futures, but what is done with those additional educational years would be very much a function of the path the society takes.

Extension of education to industry, community, and home. Again, the form this takes will depend very much on educational goals.

Concurrent replacing sequential arrangement of education and work as we move into the learning society. One moving force is the rapidly decreasing half-life of occupational skills. Another, in the person-centered future, is the synthesis of mind-forming work and educative episodes as the central activity of a self-rewarding life.

Increasing departure from traditional methods of instruction. It seems clear that classroom and lecture schools as we have known them are a thing of the past. Overall direction taken by the future society will be determinative as to whether the emphasis is on educational technology for systematization, efficiency in achieving behavioral objectives, and economy, or on new opportunities for individualized learning opportunities for open-ended growth.

Competition reduced by individualized programs is a possible trend for which there is considerable pressure. Whether it materializes depends very much on which alternative future the society moves towards. Competition as a stimulus toward excellence has salutary effects. On the other hand, in some forms it operates to lower self-respect and self-expectations, and conflicts with educational goals.

Increasing fraction of educational costs will be obtained and distributed on a national basis, since this seems necessary to even approach equality of educational opportunity this trend is not necessarily incompatible with strong local control of schools.

Extension of power and control to new groups—teachers, students, minority groups, etc. This represents a long term trend in the society in general. The rapidity with which the power sharing takes place is related to the resolution of the pluralism issue. The extent to which a student shall have control of learning content and sequence depends upon how the educational goals issue is resolved.

Increasing blurring of the distinction between vocational and academic education, quite possibly to the point of eliminating narrow vocational training from elementary and secondary schools altogether. Pressure will continue to rise to eliminate the labeling as inferior which tends to occur to students placed in vocational training courses.

More differentiation of learning-facilitation roles (teaching assistants, aides, et cetera). This seems a likely trend with any of the alternative futures.

Movement toward an atmosphere of shared learning, nonauthoritarian attitudes, mutual respect between facilitators and learners, deprofessionalization, seems a possible trend which is compatible with the person-centered society, but not with more authoritarian futures.

EDUCATION'S NECESSARY TASK

The temptation is strong in us to ignore forecasts of unpleasant events. When student use of psychedelics had just started, the clear forecast was that if the course of highly punitive legislation and complete proscription were attempted, all the ills of prohibition days were an inevitable consequence. This knowledge failed to avert the adoption of exactly that course.

Similarly, present forecasts of environmental deterioration, population pressures, traffic congestion, famine, third-world uprisings, radioactive waste, agrichemical contamination, water pollution, and a host of similar indicators of social dysfunction, spell inevitable trouble ahead. Yet we procrastinate. If the analysis of unsolvable macroproblems in section II is at all on the mark, these troubles will not be avoided by the usual muddling through. A drastic and rapid shift in orientation is imperative, on the part of the entire industrially developed segment of the world. Nothing less than a new guiding philosophy will do.

Ferkiss (1969) outlines three basic and essential elements for such a new philosophy. First is what he terms a new naturalism, which affirms that man is absolutely a part of a nature, a universe, that is always in process of becoming. The second element, the new holism, recognizes that no part can be defined or understood save in relation to the whole. The third, the new immanentism, sees that the whole is determined not from outside but from within. It follows from these that meaningful social policies must be ecological in character, that is, they must be based on a recognition that any decision, any change, affects everything in the total system. Men's actions and the forces they set in motion are all part of the developing whole; every part of the whole has power and influence; every living particle is a source of direction and life. If man is to acquire the necessary sense of responsibility for the impact of his own actions on the shaping of the whole, he must so internalize these ideas and make them so much a part of his instinctive world view that they inform his personal, political, and cultural life (pp. 250–254).

At the same time that Ferkiss and others argue that a new guiding philosophy is urgently needed, there appears to be (as we saw in section VI), increasing espousal of the perennial philosophy premises, which are completely compatible with the elements that Ferkiss claims are required. Whether this seemingly spontaneous emergence of a new outlook is fortuitous coincidence or the result of unconscious response to a subliminally perceived need of society is a moot but unimportant point. In either event, the coincidence of the need and the emergence increases the likelihood that such a value shift will take place.

If, indeed, the foregoing analysis is sound and the challenge of the times is as represented, then it would appear that responding to this challenge is an educational task of the highest priority. In saying this we are not referring solely to the schools. To be sure, it is all of us who need to educate ourselves:

1. To emotional as well as intellectual awareness of the ineluctable fact that we are one race, on one planet, and that only we can take responsibility for the fate of both, for the stewardship of the future;
2. To the shift in basic premises and operative values necessary for a tolerable future, and to the evidence that such a shift is also congruous with the essential nature of human beings; and
3. To the realization that even if such a transition is made, the strains on the social structure in the decades just ahead will be of such magnitude that a strong binding force will be required to hold it together.

Let us briefly comment on these three points. In both the first two, changes are implied for the individual which will invoke participation of feelings as well as intellect. It is not enough to be intellectually aware that at this point in history nationalism is a suicidal course, or that it would be desirable for people to be differently motivated. Emotional and conative faculties must be engaged. If these two points are to be implemented, educational experiences must be contemplated which are akin to psychotherapy in that they aim at bringing the individual into closer touch with himself, to where he makes his own discoveries that result in a felt realization of the inevitability of one inseparable world, and a felt shift in the most basic values and premises on which one builds his life. In a sense, this means bringing something like the person-changing technology, as discussed in section V, into the educational system. Education to develop an ecological sense is education toward total sensibility. This is radical doctrine. It is a step not to be made lightly, nor in the absence of the third component.

As to this third point, what it means, bluntly stated, is that the nation will require in the years just ahead a strong order-maintaining and justice-dispensing system and a reversal of the image of police as oppressor, which is presently held by a large segment of the population. The counterimage, of a fair and upright protective force to preserve our delicate and hard-won social values, will not be easily attained. It is a common task for the educational system to carry out together with the forces for order and law. The schools will have to communicate an appreciation of the need to preserve and protect our democratic institutions, and a portrait of the law enforcement officer as the protector of individual rights and safety, regardless of whether that individual has black skin or his hair style is a badge of protest. The portrait must be accurate, which implies that the enforcement agencies must reform the recruiting and training of their officers. Finally, the community must be educated to demand and pay for such a select police force.

To implement these three points is no small educational task. From present signs, one would have to judge that there is little likelihood that we will undertake it. Nevertheless it seems to be what would be implied by taking seriously the analyses which precede.

CONCLUDING REMARK

In summary, what we have said in all of the foregoing is essentially that one fruitful way to look at our changing society is as a society in process of choice—choice among alternative futures, choice among alternative belief-and-value systems, choice between ennobling versus debasing images of man, choice of how some sense of coherent authority will be restored.

At the very least, the educational planner wants to keep attuned to trends in this choosing process. In this regard, we seem to be at a crucial point in history. The forces for radical change are growing rapidly: the counterforces likewise. Events of the next few years may very well portend the general direction of movement for decades to come. It is for this reason that we have devoted a significant portion of this paper to an interpretation of the manifest revolutionary forces.

But idealism and concern run strong in educators. Those who wish not only to fit in with the future, but also to participate in the choosing of it, need to understand what is at stake in the choices—the issues beneath the issues—and how those deeper concerns relate to the more specifically educational issues. This paper has aspired to be, in some small way, a partial guide to such understanding.

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EDUCATION AND EMERGING SUPERINDUSTRIALISM*

BY ALVIN TOFFLER

I don't think we can begin to understand the problems of disorder, anomie and lack of learning in the classroom until we first shift the frame of reference outside the United States, to include the entire high technology world. The problems that we are suffering here take a special form because of the Vietnam war and the specific racial problems that we have. But the underlying difficulties, I think, appear in one form or another in Japan, in England, in Germany, in Sweden and all of the nations that are now beginning the transition from industrialism to superindustrialism.

Basically, the reasons for this, I think, have to do with the mismatch between an education system which is perfectly attuned to producing people to live in an industrial society and a society which is itself increasingly less industrial and more superindustrial.

It seems to me that what is happening is something like this; on the one hand, in all of these countries, young people are growing up faster than they ever did before, and nutritionally, the standards are rising so rapidly that girls menstruate at increasingly early ages, and boys reach full growth years before their fathers did. A form of accelerated physical maturation is taking place which has a lot to do with the way that young people feel at different ages. And then, with that, there is a comparable and perhaps even more astonishing acceleration of what might be called informational development. All of the young people are bombarded by more information from more diverse sources, at a faster clip than in any previous generation.

Whether this acceleration of physical and informational growth is matched by accelerated emotional development is, I suppose, something for psychologists to ponder.

But the plain fact is that young people today are different from young people in our previous generations. In a sense, the 15-year-old of today is more like an 18-year-old of a decade ago, than he is like a 15-year-old of a decade ago, and in a kind of crude way, the schools really ought to be re-calibrating their chronologies. They ought not regard a 15-year-old student the same way they regarded 15-year-olds a decade ago. For that is to misplace that student in the continuum of development, to misunderstand how that student feels and perceives the world; and so, on the one hand, we see a process of accelerated development of maturation.

Now at the same time that this happens, a variety of changes that have been occurring in the society as a whole, which have added up to longer and longer, more and more protracted education for larger and larger numbers.

In fact, throughout the world for the last century, progress has sometimes been measured in the degree in which education has been made compulsory. Even now, in England there are debates about extending further the compulsory period of schooling. This, in my opinion, might be a drastic mistake for the British to make.

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*Excerpts from an interview with Mr. Toffler by the Staff of the Select Subcommittee on Education.

But be that as it may, at the very same time that we find young people growing up faster, we are retarding their entry into the economy. This is especially significant when we consider the number of jobless Ph. D.'s today. If we suddenly dumped 7 million more young people into the labor market the results could be disastrous.

Thus we say to them that before you can go out and take your place in the society as an "adult" that you must first jump through certain hoops, and millions of young people are encouraged not only to go past the high school level but into the colleges and beyond. We place even more stringent demands upon them and encourage many of them to stay in the educational system for longer and longer periods of time. Of course in the United States, the draft and the war placed enormous, excruciating pressures on many young men to stay in an academic environment long after they wished to be elsewhere. But even in other countries where the draft was not an issue, we see the same prolongation of the educational process.

Now it seems to me, that these two forces are in conflict with one another. On the one hand, young people are growing up faster and are more educated about the way the world is, even before they set foot in the real classroom. They are eager to get their hands on "real work", to participate in "real decisions", to have a "meaningful"—forgive the cliche—relationship to the society as a whole. But the society rather than welcoming them into adult roles, in effect, forces them off into an enclave, shoves them into a meat locker, as it were, and tells them to stay cool for 5, 10, or 15 years, for interminable periods of time What we are doing, in effect, is corking enormous, explosive pressures in fragile institutions that we call schools and universities.

The schols and universities can be regarded as vehicles for preparation or rather as institutions that will prepare young people for a role in society. But they can just as easily and with as much justification be regarded as waiting rooms—as detention pens in which we keep large masses of young people off the labor market until the economy is prepared to absorb them.

This puts young people into an extremely difficult psychological and social position. This puts them into an untenable role, one which frustrates all of their socially directed energy, intelligence, and imagination.

At this point, I think a distinction needs to be made between three different streams of young people. The first constitutes those boys and girls who complete their high school education or drop out of high school education and move immediately into jobs to the higher society. These jobs may not be the best paying or the most fulfilling in the society, but, so long as they are jobs, the young people moving into them find themselves immediately in a socially accepted role within the country as a whole.

The young man who operates a drill press or works at a gasoline station or who works on an automotive assembly line sees himself as, on the one hand, performing a man's role, in the sense of feeding himself or his dependents, and also as producing something of value within the society. And the entire society looks at him differently than it does at a student who is not yet productive in the traditionally economic sense.

It is not surprising to me that, by and large, those young people who had moved directly into the shops, factories, and offices from their education, and who had done this at an early age, are, by and large, the least militant and least restless at the moment, although there are indications that, too, could change. By and large, these young Americans, in particular, those who have jobs, tend to be reasonably conservative in their orientation. They may be anti-Vietnam, but in their other political views they are scarcely radical, and, if anything, they are more likely to be found beating up the long hairs than joining them in demonstration marches.

A second stream of young people are those who either complete high school or fail to complete high school, but cannot get jobs. Now these are blacks, Puerto Ricans, Chicanos as well as some whites. And not surprisingly, this group is restless. These are not intellectuals, these are not college-bred men and women. Nevertheless, they are a source of a great potential violence in the society and they are excluded not only from the immediate economic and psychological benefits confirmed by employment, but even from any hope of a decent job later on.

This group is disenfranchised and alienated and, in this sense, locked out of any real participation in the way society is run.

The third stream of young people are the college youth. These students are told by their elders that someday they will run the society, that they are the chosen leaders of society. But they are also told that for the immediate future—and the immediate future here is not very immediate, since it may run as much as 5 or 10 years or more—that they are not yet "ready" to assume significant roles in the society as a whole. And so we see among them a sense of disenfranchisement, a lack of control over what happens around them, a sense of exclusion from participation in decisionmaking in the society. And it seems to me entirely natural and understandable that young people in the third stream should be sympathetic to the moods, the needs and the movements of young people in the second stream.

I believe this accounts for the great interest that college students have taken in the movements among black and other minority populations, and their interest in the struggle against worldwide poverty. They see themselves not as an elite corps preparing to take over society, but as a harassed and disenfranchised class sharing resentment with other ostracized or persecuted minorities.

All of this is occuring during the most rapid transition that any major society—any large scale society—has made from one stage of eco-technological development to another. All of the United States and all of the high technological states are, in my view, passing through a wrenching historic transformation that is deeper and more violent than the industrial revolution and which is already beginning to produce in our midst a new form of society that varies radically from industrialism.

Industrialism is a system based largely on factory production, on bureaucratic organization, on materialist values, on ruthless exploitation of natural resource and on routine repetitive labor. I believe that the emerging superindustrial society, rather than concentrating all production in factories or offices may, with the coming of the extremely advanced telecommunications technology, be based, in large measure, on work performed at home rather than a centralized location.

The typical forms of organization are likely to be what I have called "ad-hocratic," that is, temporary and nonhierarchical, filled with men and women continually changing their human and organizational relationships. This ad-hocratic form contrasts sharply with the bureaucratic structures characteristic of the industrial age and also defies the traditional hierarchical chain of command based on the assumption that people "on top" make the decisions and people "down below" carry them out. The pace of production is too rapid in superindustrial systems for the traditional hierarchy to stand since frequently it slows rather than accelerates the flow of communication.

In terms of values, we can already see a shift away from the almost monomanical materialism that characterized both Communist and capitalist industrial societies.

The superindustrial society, rather than regarding resources as limited—with the implication that he who gets them first gets rich—will, in order to survive, be based on new recycling processes. What are regarded as resources today may be worthless tomorrow, whereas what we, today, discard or ignore may be crucial to future production. The shift is from a static to a process conception of resources.

But perhaps the most important shift which is now already occuring and which forms part of the transition to superindustrialism has to do with the role played by information. Knowledge has always been a component of production. The primitive man who carved a canoe or dug a ditch employed knowledge in doing so. However, throughout man's modern history, land, labor, and capital were the primary components of economic completence production, and the knowledege component was frequently trivial. Today we are beginning to recognize that knowledge, in the form of formulae, organizational designs, indexes, and systems of data classification, patents, copyrights—is becoming more and more central to production.

This brings with it an astonishing change in the class relationships of the society. Conditionally, a "class" has been defined as a large group of people who stand in a common relationship to one or another of the factors of production. If this definition is acceptable, then certainly we must recognize that students today form a new class in the society—a large class of people who stand as preentrants to the knowledge system required for further production.

Not only do students, in this sense, stand in a new relationship to the economy, but they show many of the signs of an emerging economic class. For example, it has been noted that labor struggles in the United States tended to be anarchic and violent until the late thirties, when the right to organize was recognized and systems for dealing with labor-management conflicts were created, including such institutions as the National Labor Relations Board, the Federal Mediation Service and so forth. The process by which labor's rights were accepted and the forms of conflict institutionalized led to a far less anarchic pattern of labor-management interaction in the society. We may before long begin to see the institutionalization of conflict between students, the universities and the society at large, through new legal systems—legal safeguards for students, student rights, through new systems for student participation in the governments of their own institutions, et cetera.

The parallel, however, between the student struggles of the sixties and seventies and the labor struggles of the previous age should not be carried too far. One of the key differences here is that when labor unions demanded recognition or when they struck for increased wages, they were asking for something that employers had it in their power to give. However, as Philip Weedell once pointed out to me, when students ask for a better education, this may be something that the Columbias and Cornells and Berkeleys do not have it within their power to offer.

One reason for the inability of traditional education institutions to cope with student demands for improved education is that they are organizationally and intellectually rooted in the industrial and even preindustrial world. Most of their efforts to educate young people are premised on assumptions about the nature of social reality that we now are compelled to change.

For example, all education systems proceed from some image of the future, whether this is recognized or not. The assumption made is that the learning transmitted to the learner will in some way prove useful to him in the future. However, the present education system and its leaders have no conception of the future of society—other than a blind and mistaken expectation that it will be "more of the same." Educational leadership has not as yet recognized that we are in the midst of a fantastic human revolution. Therefore, to the degree that it ever bothers to think about the future, it simply presupposes that the industrial system of today will endure into tomorrow.

This linear, straight-line extrapolation of the past and present into the future breeds a series of dangerous misconceptions. First, it suggests to students that tomorrow's world will be even more bureaucratized, standardized homogenized, routinized and "dehumanized" than the industrial system of today. What is overlooked in these extrapolations is the very power, depth and violence of the changes now taking place. In the midst of a revolution it is impossible to make an accurate forecast of the future by using such straight-line methods. Rather, it becomes necessary to employ imagination—to look for dialectical reversals, upheavels, twists and turns. It is not simply that the frequently unstated image of the future held by most educators is depressing, it is hopelessly inadequate.

I believe that tremendous forces are now pushing the society in directions quite different from those that prevailed during industrialism and that education has to begin to take this into account.

There is scarcely an educational conference that does not devote some of its time, for example, to the question of "change." Every speaker acknowledges that change has accelerated, but the implications of this for education itself and for curriculum are seldom spelled out. The acceleration of change means that we are pumping new, strange, bizarre, unfamiliar circumstances into the environment at a faster and faster pace. Reality itself is churning and turning over so that yesterday's truth becomes today's fatuity. I believe that the acceleration of change decreases the authority of the teacher and makes it more and more important for the learner to check the abstractions of the classroom against the realities outside.

The faster the pace of change, the more frequently must classroom abstractions be reality-tested. In a society that is slowly changing, the abstractions handed down from one generation to the next, or from teacher to student endure through time. In our society, because of the rapid rate of change, these abstractions themselves must turn over more and more rapidly to reflect changes in the reality outside.

For example, the image of the Japanese which has been presented to generation after generation of American youth and which portrays the Japanese as an essentially backward, imitative nation with some secondary talent for mechanical devices but with no serious originality, may have accurately reflected the situation up to the last 5 or 10 years—I don't believe this was, as stated, true even then. Today, with Japan's gross national product increasing between 10 and 15 percent a year, with its electronic equipment—tape recorders, television sets, automobiles, and other products—cutting a wide swath through the American marketplace and frequently displaying innovations far in advance of those available in our own competitive products, the old picture of Japan quite clearly needs some updating. A significant debate is taking place among economists, futurists, and others as to whether Japan will be the leading economic nation on the globe within the next 25 or 30 years or whether it will merely be No. 2. But, for the most part, America's classroom teachers have no conception of the change of reality. This example of obsolete images could be multiplied many times.

Basically, the speedup of change in the outside world means that students must now begin to get out of the classrooms to test what they learn against the new and continually changing reality out there. They can no longer take for granted that what they are taught reflects the way things still are.

In a society whose industrial organizations are beginning to move away from traditional hierarchical forms in response to new forms of organization such as project management, task force organization, et cetera, it is not surprising that students begin to challenge the hierarchical structure of the school itself. Authority in a superindustrial society will not flow simply up and down in an old fashioned chain of command, but will feed back from bottom to top and radiate in many directions within the organization.

The antiauthoritarian mood of today's students reflects, in some inchoate way, a recognition that the present systems, that is, the traditional systems within the educational community, are out of alinement with the emerging reality. Today, just as yesterday, most students arrive in school and become part of a class. This means a group of students who stand in a more or less common relationship to a teacher who is superior to them, not simply in knowledge, but also in power. As the student advances through the school system from first grade to 12th grade, he or she moves into a succession of similar structures, even on through college and university. The student gains experience with only this one organizational form. Yet in the future, people are going to have to deal with an extremely wide variety of organizational forms, temporary problem-solving groups, ad hoc committees, organizational forms that involve participation by top level as well as lower level personnel, and so on. The present system gives a student training for participation in only a single organizational form, rather than advance training in working with and learning in alternative organizational structures.

Faced by these difficulties, and by the recognition that the universities today represent a holding operation—that is, an enormous organizational pool in which people are kept until the society is ready to allocate them to various roles in the economy—what are we to do? It seems to me that we have various alternatives open to us. The first is simply to keep them in schools and continue doing to them what we have been doing until now. Any such course, it seems to me, is doomed to failure simply because our young people will not hold still any longer under the traditional conditions. Nor should they.

The present educational system is one which has been carefully honed and polished through time to do as efficiently as possible what needed to be done for an industrial society. It does, in fact, prepare most, though decidedly not all, young people for life in a factory-dominated world. However, the very conditioning that adapts or preadapts the individual to industrialism may make that same individual less adapted, less capable of coping with change and more likely to suffer from future shock as the society explodes into a new phase.

A second alternative is to close down the schools entirely. We could, at least in theory, stop providing a custodial service for parents and a refrigerated meat locker for industry. We could save enormous sums of money by simply padlocking the kindergartens and colleges and hope for the best. Some educational philosophers—and here I exempt Ivan Illich who represents a special and extremely interesting case—have gone so far as to suggest this course of action, urging us to send our young to live with farm families or to educate themselves by hook or by crook.

This alternative strikes me as not only fanciful, not likely to be adopted, but also meretricious. It reflects resignation and surrender rather than creativity and intelligence. It simply is a bit of middle-class posturing, a throwing up of the hands, rather than an attempt to design more intelligent ways of coping with our problems. A third and more useful alternative has been widely discussed in Washington for many years but has never really achieved the attention of the Nation that it deserves. This is the proposal for a universal service. Typically, the idea of a universal service program is presented as an alternative to military conscription and is seen as providing options for those young people who prefer not to serve in the Armed Forces. However, there is a very important potential link up between the idea of service to the community, and the idea of education itself.

Many institutions, colleges, and universities have in the past few years begun to develop community service or community action curriculums programs in which students are given an opportunity to involve themselves in real-world problems—either those of the community immediately surrounding the campus, or of a nearby urban ghetto, or, in some cases, the problems of cities halfway around the world. Whether such courses or programs are initated by faculty or student action (and I believe that most of them have their origin in student initiative) they have within them, I believe, the seed of very significant advance in our conception of education.

I believe we can design a—a learn-while-you-serve system—which will not be centralized, not run by the Federal Government, not standardized, not a civilian version of a military institution, but rather a very varied set of education-linked service programs operated by students and faculty at thousands of schools, colleges, and universities. I believe that significant parts of the curriculum can be built around real-world problems and community needs.

We find ourselves in the ironic position of being a very wealthy nation, and yet when we come to Capitol Hill or when we visit city hall and ask for some problem to be taken care of, we are most usually turned away with a helpless shrug and the insistance that the resources are missing. I would propose that we have far more resources available to us than most people now suspect and that the time has come to begin to look upon the 55 million or so young Americans in our schools and colleges not as a parasitical organism, using up our assets, or even as an investment in the future, but as an active resource that can be tapped now to help deal with some of the difficulties in our cities, communities, neighborhoods, and more broadly, in the Nation as a whole.

I believe that unless we unleash the energies of this part of our population—virtually one out of every four Americans is a student—that we will continue to build up fantastic and dangerous pressures within the student community, pressures which will result in the destruction of our schools and unnecessary bloodshed in our cities.

There is a screaming contradiction between what we tell our young people when we say to them you must stay in school to learn sophisticated skills while we older Americans run the system. We tell them that they will step into our shoes and take over when they are ready, and that, in the meantime, we will keep things rolling along toward ever greater levels of affluence and social happiness. The reality, however, is obviously quite different. Young people, rather than seeing the society as being smoothly and effectively run by their elders, see instead an incredible series of problems, not simply questions of pollution, noise, dirt, health, racial inequity, bad housing, but also the inability of the community to police itself, to take care of its aged, to clean litter off the streets and so on.

Faced by the awesome gulf between the protestations of the older generation which suggest that the best thing young people can do is to get lost in academia for a decade or so, and the escalating problems of the society, students are put in an impossible moral bind. They can, it seems to me, decide to turn off or turn inward and lose themselves in some subjective nirvana, with or with out the aid of drugs, or they can instead demand a right to help run the society within which they live, and to help deal with the explosive problems around them.

To put this more practically, it seems to me not impossible that the students at a university, and by extension this might be done at lower levels of the school systems as well, could be encouraged to single out certain community problems that they would like to address their energies and their imaginations to, and that teams of students, working with faculty and with participants from the community, could form themselves into action groups to come up with new approaches to this or that community problem.

For example, I believe that students and universities—with the help of community people—could introduce a totally new dimension into the care of the aged in our society. Most American old people rot and wither in loneliness, seldom visited by a fellow human being with any concern for their needs. At the same time, we have millions of young people who could learn much from contact with many of our older citizens, but who almost never in the course of an ordinary month of their lives come in contact with older people.

New York City is shuddering and rocketing with excessive noise. I don't know how to solve the noise problem of New York City, but I suspect that turning loose several thousand of New York City's college students on that problem would, before long, begin to produce a flow of useful ideas and programs for monitoring and controlling noise levels in the city. I think it would be especially interesting for a group of students, along with faculty and community people, to work with the police, for example, in a program to lower crime levels within a small area near a university campus. I suspect that the students would learn from such an experience just how difficult the problems facing the police are. But I think the police would also learn a good bit. However, we look at the problems of crime or the aged or noise or pollution or any of a dozen or score or hundred of other problems that one might list, we can find ways of encouraging student participation in attempts to solve them—and we can design curriculums that relates to them.

Such service activities not only ought to, but could very elegantly, be connected with the learning goals, both of individuals and of our education institutions. For example, at one point or another, intelligent children come home and ask plaintively of their parents why they are being asked to learn subject *X* or subject *Y*. The answers they get from their parents as well as from their teachers are usually a collection of evasions designed to conceal the reality that they are asked to learn subject *X* or subject *Y* because their fathers learned subject *X* or subject *Y*. Students who do not know why they need to learn a subject suffer, by definition, from a lack of motivation. It seems to me that we might attack the problems of motivation in education directly through the service concept. Rather than suggesting to students that they must learn subject *X*, *Y*, or *Z* because that is the way it was done in the past, we would do better, if students could see that our community or our city, our Nation, has a problem with *A*, *B*, or *C*. We could say to them honestly, "We need your help in trying to solve that problem."

Once various teams of students, faculty, and community people are brought together to deal with the problem, it immediately becomes necessary for all the participants to undergo fresh learning. If students are going to help deal with the problem of excessive traffic, somebody is going to need to know some mathematics. If the problems of pollution are going to be confronted, somebody is going to have to know some chemistry. If the problems of crime in a community need to be dealt with, somebody is going to need to know something about sociology, economics, psychology, and the sources of crime. If the problems of nutrition or care of the aged are involved, a whole series of other "subject matters" immediately become relevant. In this way, it becomes possible to tie learning directly to action and the problem of motivation becomes far less severe than it is in any American school today.

The advantages of some such system based on what might be called the edu-service concept would be multiple. For example, a frequent complaint of young people is the sense of alienation, the feeling of isolation, loneliness in the midst of the crowd, the sense of having relatively few people around them with whom they can communicate freely and openly. I believe that action teams of the kind I have suggested not only help get at questions of motivation, but also could begin to break down the sense of loneliness and isolation that so many American students feel.

Groups with shared goals tend to become emotionally involving and provide a basis for friendships and the kinds of emotional warmth that many students find lacking in the American educational system today.

Similarly, the design of action groups to include not only students but faculty and community people, is a generation-bridging device, a way of bringing members of several generations into face to face contact with one another, but not across the gulf that yawns between the teacher and the seats down below, not in a ritualistic association, but in a direct sharing of real-life experience. I believe that this close intergenerational contact would have enormous value in breaking down the much discussed but seldom bridged gap.

Signficantly, from the point of view of education the connection between service and learning provides a way to connect theory and practice. It not only permits but encourages the student to reality test the abstractions of the classroom. Generalizations that don't work when an attempt is made to apply them in real life need to be re-evaluated, not simply shoved down the gullets of the next succeeding class of captive listeners. Edu-service repairs the break between theory and practice.

For many students the edu-service idea can also break down the sense of uselessness, the emptiness that goes with being a student in our society today. This sense of hopelessness and uselessness derives not simply from what goes on in the classroom—the boredom, the repetitiousness of much that passes for education—but also from the artificial social role occupied by young people in our society. Young people in most previous societies and in all poor societies, begin to perform needed functions for the family and the economy at a very young age. We thought we were doing our young people a great service by stamping out child labor.

We made the mistake, however, of stamping out along with child labor, any sense on the part of a child that he or she is needed by the surrounding society. Indeed, despite all our fancy rhetoric about how our students are going to be the leaders of tomorrow, the essential message which our society drums into the heads of our young people is that they are not needed—not needed because they are not yet adequately skilled. This message is, as I have suggested, a lie. We not only do need our students, we can no longer run our society adequately without them.

Edu-service provides a way to break down this sense of uselessness and needlessness which, I believe, lies very close to the core of much student discontent. Perhaps the most important advantage, however, of the edu-service concept is that it opens a way for young people to come in contact with the changes that are already roaring through our society, changes they must learn to master, if they are to survive in the decades ahead. The years between now and the turn of the next century are likely to be more crammed with change than any previous period in human experience.

An education which keeps Johnny away from the real world where changes are taking place, which attempts to prepare him by filling his head with obsolete abstractions, which assumes simply a straight-line continuation of the main features of industrial society, is an education that creates victims of future shock. By encouraging young people to move out into the community, by tying curriculum very directly to service activities, we put Johnny into a position in which he begins not merely to see change on his television screen, but to engage in change in the community, itself. This familiarity with change cannot, however, help but raise questions in Johnny's skull that are seldom raised by educators today—questions about the future.

One of the most astonishing weaknesses in our present day education is its almost total failure to recognize the significance of the future in learning itself. Tremendous pains are taken to orient young people in terms of space—courses in geography, for example. The student is taught to read maps. He is taught the location of his city, State or Nation on the globe. He is taught that the earth is a spinning ball, which is part of a larger solar system, which, in turn, is part of an even larger galaxy.

But when it comes to orienting in time, our present educational systems perform a strange and, in fact, I believe, dangerous fraud. Johnny is taught as much about the past as we can possibly stuff into his memory tank. If he has a particularly enterprising teacher, he will be taught a little bit about the present (it's called, quaintly enough, current events) and then time typically comes screeching to a halt in the classroom. Johnny is seldom, if ever, asked where change today is carrying us, what the future is likely to be like, or even more important what the future ought to be like.

Centuries ago, in slowly changing societies. the curriculum was based entirely on the past. The most efficient way to teach a young person how to cultivate his crops or to gouge out a tree was to teach him how his ancestors had done it. This was efficient because it was based on a sound assumption: The assumption that since the society itself was changeless, the techniques of the past would be just as useful in the future as they were in the past.

As society moved into the industrial phase, all sorts of new problems arose for which the wisdom of the past began to prove less and less adequate. A great educational philosopher, John Dewey, fought a tremendous struggle to free education from the chains of the past. Among other things, he suggested history be taught not for its own sake, but for what it could teach us about the present. For his pains, Dewey was attacked as a presentist. And, in fact, the schools are still oriented to the past, rather than the present.

I would suggest that the superindustrial revolution we are now undergoing presents our educational systems with a new challenge. Just as the curriculum of the past was the past, and the curriculum of the present is the present, the curriculum of the future may have to be the future.

We need to begin to develop in Johnny's head—or to put it more properly—we need to encourage Johnny to develop images of the future, of possible futures, of probable futures, and preferable futures. He needs to have some image of the future, more accurate, more rich and more imaginative than the image which simply regards tomorrow as a linear extension of yesterday. I believe that an education which takes advantage of the learning inherent in community service can help a learner deepen, correct, and enrich his own image of the future.

WHY AN IMAGE OF THE FUTURE IS IMPORTANT

For people who are going to have to deal with an avalanche of change in the short span of a few decades, nothing will be more important than the habit of anticipating change. We need an education which helps inculcate this habit and which helps the individual to develop and continually revise and improve his images of the future. A sense of the future, a sense of its possibilities, likelihoods, and dangers, becomes, in a high-change society, an absolute survival necessity. People cope better when they have some awareness of tomorrow, and schools must begin to design this awareness into the action curriculum.

POSTSCRIPT

I think this is already happening. It is not just a question at this point of rhetoric. There are now experimental community service programs of one kind or another all over the United States, although they have not as yet begun to seep down into the elementary and high school levels. By the way, this correctly suggests that I believe community service is not something that starts at college, or that should be bracketed by a 2-year service period. Rather service ought to be regarded as something we do all through our lives, starting from a very early age. We are beginning to get widespread interest in the eduservice concept. But it is not yet seen as a fundamental part of the learning experience, and it is not yet recognized as quite legitimate or academically respectable, and it is certainly not yet funded with sizable budget.

On the parallel question of the future in education, I have seen signs of an incipient movement forming in the United States among educators and students behind this idea. My mail brings me not simply reports about courses now being given in scores, perhaps hundreds, of universities dealing with the future in one way or another, but also requests for information and reports of experiments in elementary schools and high schools as well. The idea of teaching courses about the future is clearly an idea whose time has come. My attendance at educational meetings and conferences, and the opportunities these afford me for discussion with educators and students, suggests to me that there is a very healthy and rapidly rising interest in educational futurism. Moreover, I suspect that this interest will soon take on a more organized form.

Now as to what practical steps might be taken:

One might begin in a school or university by creating a council of the future—a group of students, faculty, administrators, and community people merely to review the ongoing curriculum or practices of the institution, but to formulate some image of the future; some set of assumptions about the way life is going to be, from which the institution can then deduce appropriate goals and curricula.

It seems to me that the future must be a starting point some sense of where we are going and where we want to go. It must be the starting point of any rational educational system. Every institution has an implicit image of the future. This image, this set of assumptions, shapes the decisions of its policymakers. Yet I believe the image of the future held by most educators must be radically revised and the way to begin is by making their assumptions about tomorrow explicit and hence subject to debate. Only after this is done can a sensible set of educational goals be defined.

The idea of councils on the future, the idea of introducing a combination of the future and social concern into the curriculum, can bring together forces in education that are now at each other's throats. I believe that many parents would share an interest in introducing their children to tomorrow, in helping to prepare their children to cope with rapid change.

What we have, therefore, are two healthy and parallel movements in education—one leading toward community and social involvement, the other leading to a greater concern for and consciousness of the future. Together they amount to what I have elsewhere called a strategy of "social futurism," and I believe this strategy holds great promise for education.

I don't believe that either of these movements will advance without opposition. The introduction of courses about the future or similar curricular innovations will run smack up against entrenched traditionalism and postorientation. The introduction of a greater service component into the educational system is also likely to occasion conflict. When students go out and try to help make change in their community, to help solve real-world problems, they are going to encounter resistance. But this is important for them as well as for the community. Learning is accelerated when attempts to bring about change meet resistance. This compels the individual or the student or the group to search for alternative forms of action, it helps them understand the sources of resistance, and so on. It is not a panocea. It will not be an easy thing. Yet we must encourage both these movements in education and bring about their convergence. Only through a philosophy of social futurism can we reconnect learning with life.

My own feeling is that while we may have 18,000 school authorities, we have only a handful of kinds of schools. That the system is highly standardized and that this is one of the industrial characteristics of the system that I referred to earlier. It seems to me that the Federal Government must play a role different from that it has traditionally played in dealing with such problems. Rather than seeking to standardize, bring about uniform criteria, introduce nationwide curriculum reforms and so on, the Federal Government ought to be encouraging a far greater diversity of educational forms, a much greater openness within the system to permit multiple options and alternatives.

KNOWLEDGE OF THE FUTURE: A PRIME REQUISITE FOR PLANNING

BY ROBERT J. WOLFSON

Planning, of any kind, implies concern for a future. To plan means to set up a series of hypotheses about the sorts of contingencies which might arise, and associated with each hypothesis a set of actions to be put into effect in the event that the hypothesis appears to be supported by events. Depending upon the particular nature of the situation within which the plan might be carried out, the set of actions may be set in train before the hypothesis itself is capable of review. Thus, the decision to wear safety goggles while working in front of a bench grinder may well turn out, in the event that no tools shatter and no pieces of material fly against the goggles, to have been unnecessary. Yet the decision to wear the goggles is part of a plan, in this case a precautionary one, whose concern is to protect the worker against injury in the event that one of the above-mentioned untoward events does occur.

When the planning horizon is some distance in time from the period in which the plan is developed and put into effect there is always the considerable risk that hypotheses about future occurrences which could affect the outcome of the plan may be erroneous. Whenever possible, then, it makes sense to develop a plan which is as insensitive as possible to forecasting errors of this sort. That is, as much as possible, plans should be developed which will be unaffected, or insignificantly affected, by errors in forecasting what appear to be the most questionable and significant future alternatives. But this is not always possible, so for such alternative futures as cannot be finessed in that fashion, alternative sequences of action must be developed.

From the foregoing discussion it is obvious that in the conduct and the implementation of planning the future must be taken account of. It is this to which we turn now, as this concern with the future is the focal issue in this paper.

What can be said about the future which is empirically supportable? All that we know with any certainty is that the future is that region of space-time which bears dates not yet realized in general human experience. Put in everyday language, what we are saying is that the future is ahead of us in time. But that tells us nothing about the nontemporal aspects of the future. Will we be alive then, who will win the election of 1992, will there be an election of 1992, what will the life of the average citizen of the United States be in 1992, what will be the typical occupational distribution of Americans in 2013, how will those who occupy the twentieth through thirty-fifth percentile of the family income distribution of the United States in 2013 earn their incomes, and how will they have been trained for their work, and so forth? It is questions like these, running into the millions, which must be answered, or answers to which must be estimated in order for us to describe the futures.

But how can we answer these questions now? The answer is that we cannot answer these questions now, but we can propose methods for estimating answers to these questions. It is in the use of these methods, however crude and subject to error they may be, however much they may depend on sheer fancy and reflect nothing but hope, that the future has its only existence in the present.

The future lurks behind an incredibly large portion of human thought and action. Without some notion of time and events yet to come words such as hope, anticipation, fear, would be meaningless. But in a certain sense this is the only existence the future has. That is, if the future exists at all in the sense in which objects or events which are now occurring can be said to exist, it exists as anticipations in the minds of those who think of the future. Similarly, if the past exists at all, it is in the memories and records of the past. But the future is less well documented, less well understood, than the present or the past. The only basis for any knowledge of the future is conjecture, extrapolation or forecast (insofar as these can be said to be distinct from one another).

Insofar as methods of conjecturing about, extrapolating into, or forecasting the future can be developed and used with confidence, to that degree, and to that degree only, can a basis for planning be developed. Moreover, it must be recognized that the measure of confidence in such methods is dependent on two factors. First, what is the forecasting horizon? That is, for how many years into the future is the forecast to be made? Second, in how fine detail must the forecast be made? Are we concerned only with such details as the gross national product, the size of the population, and the disposition of the population between major regions of the country, or are we, rather, concerned with the income distribution of the population, the detailed expenditure patterns of individuals, and so forth? If our concern is at the former level then a long-range forecast (of the order of 10 to 30 years) may be made with a moderate degree of confidence. If our concern is of the latter sort, we must be much more tentative.

In addition, however, there are some sorts of detail, even if at similar levels of detail, about which we may know more than about others. Thus, for a variety of reasons it is easier and safer to make forecasts about economic and technological matters than it is about social and political ones. To have forecast, in 1958, some of the social and political developments we have witnessed in the past 2 or 3 years would have taken great courage. Indeed, such forecasts were not then, or even several years later, being made. They appeared to be off the map entirely. On the other hand, forecasts of the technology we have now, of the size and distribution of the GNP we have now, were being made. This is so because economic and technological processes appear to be subject to some regularities about which we have some degree of confidence, while social and political processes are less well understood.

Another factor which the past decade has underlined is the degree to which single events which appear to have erupted randomly from the great mass of social occurrences, and which differ sharply from this great mass, seem to have, in the short run, markedly affected the path of the entire society. Such events have always happened, and have always been less predictable than most other events, but the 1960's have had more than their share of them. Thus, three important personages have been assassinated in the United States in that decade.

It is impossible to say how much longrun difference this will make in the world. One reasonable conjecture is that within a century or so the world will be in essentially the same condition as it would have been if those assassinations had not occurred. But when such a statement is made we have taken on a large pair of burdens: How can we deal successfully with a conjecture which can never be tested; and what do we mean by essentially the same? With respect to the former, we speculate; we use what has come to be called the thought experiment. We try to be systematic about it, but we recognize the many large pitfalls. With respect to the latter, we clearly have become less concerned with individual lives, with short-term shifts in political and economic aggregates.

In 1970, it seems less likely than it did in 1920 that the assassination of an Austrian archduke in Serbia in 1914 would be a significant cause of major longrun historical changes in the world. That the World War did occur is not in dispute. Rather, the question is being asked: Would it not have occurred anyway even if Franz Ferdinand had not been killed, perhaps somewhat different in detail, but similar in general outlines? And the answer is being offered that it would probably have occurred.

The farther back we go in history, the more easily can we find ourselves suggesting that a particular change in the life of one person, or a few persons, would have made little or no difference in the large sweep of events, in the long run. But, let us make no mistake, in the short run the effects seem unarguable. Moreover, the more highly placed, or the more strategically situated the person, the longer the time before more fundamental forces obscure the effects of that event.

Thus, what we are suggesting is not historicism of the sort that Plato, Hegel and Marx proposed, but rather that there are fundamental influences and less fundamental ones. The fundamental influences include such items as: Ecological forces, technology, population growth and settlement patterns, the process of organic evolution etc. Clearly some of these are subject to human influence. One form of such influence is through the aggregation of the actions of millions upon millions of individual humans, each doing his own thing and adding the result to that of all others, through the processes of procreation, individual waste disposal, individual invention etc. Another form of such influence is through the detailed, troublesome, apparently expensive, difficult to implement, long-term planning process. That is, these human influences occur either in the presence or in the absence of effective planning. How can we conduct effective planning? As we said at the beginning, a sine qua non for planning is some notion of how forces beyond the power of the plan to affect will have shaped the world in which the plan is to come into fruition. That is, in what sort of environment will the actions of the plan be taking place, and how successful, therefore, will the plan be in attaining its goals?

In order to answer these questions some means of speaking of future states of affairs must be utilized. Depending upon the detailed concerns of the plan, its planning horizon and the level of detail which is required, various methods come to hand. The fundamental issues which determine the choice of method are the forecasting horizon and the probable stability, over that time range, of institutional structures and social processes which condition the indices being forecast. Thus, if the forecast horizon is rather short then most social institutions and processes are likely to remain substantially as they are. Hence, for many planning purposes, simple extrapolation of current trends would appear to be an acceptable means of describing the relevant future 5 years or less from now. Simple extrapolation means simply projecting current gross processes, and placing some estimates of probable error around them. These estimates of probable error are, in absolute terms, directly related to the length of the extrapolation period. Consequently, the band gets wider as the extrapolation time gets longer. Eventually the extrapolation becomes nearly useless because of the great band width.

The extrapolation band width is a function not only of the forecast horizon, but of the probable stability of relevant institutions and processes. That is, if these institutions and processes can be expected either not to change, or to change in an extrapolable way, then an extrapolation, or an assemblage of extrapolations, may be the easiest and most reliable means of forecasting future environments.

However, if simple extrapolation of these institutions and processes will not serve we must look to more complex means of forecasting. It may be that institutional and process change is believed, with high confidence, to be dependent on a set of factors whose course is itself extrapolable. In such a case, a useful structure might be a series of extrapolations in which are embedded models for the change of these institutions and processes.

If none of these conditions obtains, that is, if there is no basis for the erection of a structure of extrapolation and formal modeling, then one class of procedure remains whose power is much more limited. One name for this way to forecast is conjecture. Characteristic of this mode of peering into the future is the use of speculation, the generation of insightful guesses, embedded in a framework which indicates aspects of social structure and process not covered otherwise in the forecast, and which suggests interrelationships between these aspects of social structure and process. These hunches may be supplied in a completely free fashion by one person, or a small group (frequently referred to as genius forecasting), by a group of persons referring closely to roles which each plays in an open gaming (or role-playing) situation, or by individuals working separately from each other, but whose responses to a specific set of questions are aggregated and the aggregates fed back to them in specific fashion (the Delphi method is one example of this stimulated concensus technique).

It would seem that if the forecast horizon goes much beyond 10 years, and the level of concern is with much greater detail than such aggregates as the GNP and the size of the population of the country, conjecture becomes necessary. The farther in these directions the forecast must go, the more heavily must the forecaster rely on conjecture.

Choice between the alternative forms of conjecture briefly described above is not easy to make. There is no basis for testing any of these methods before the fact. The first type (genius forecasting) is dependent completely upon the imagination and judgment of the forecaster. It is, however, the least expensive procedure to conduct. All that is required is paper and pencil, a small library of social trends and statistics, and a considerable amount of nerve.

The second procedure (open gaming) is more expensive and time consuming than the first. However, the fact that a number of persons are working together, and working within the structure of roles (such as public officials, scientists, businessmen, etc.) tends to elicit imaginative responses to specific situations which are generated in the role-playing situation.

Delphi has demonstrated itself most especially in dealing with situations where events and interactions among them are easily specified. In particular the forecasting of technological change by Delphi seems to hold some promise. However, as in both of the other procedures, much depends upon the basic intelligence and flexibility of the persons doing the forecasting.

Indeed, flexibility is the key werd throughout. Forecasting the state of human society in some future period when more has changed than just magnitudes (GNP, per capita income, population size, etc.) requires an ability to rise above the limitations of one's own experience and circumstances. Without this ability forecasts will just be slight extensions of the present. That is, they will not really be useful forecasts. With this ability one or another variety of conjecture can be conducted.

What can be said about, and what can be done with, the sorts of forecasts which come out of conjecture? Recall that while we cannot know the future, when we deal with a formal forecasting technique we are assuming that in certain significant respects the future will resemble the present. Consequently, there are means of testing forecasts based upon an understanding of the structure of the present, and upon the use of statistics to extend present cases and structures. But as soon as we make significant use of conjecture we are unable to make such tests. We must rely upon judgments as to the reasonableness of the conjecture, and upon the breadth of coverage of possibilities which is afforded by a set of more than one conjecture.

That is, one conjecture is at best illustrative of what the future could be. A number of them, if well constructed, might give us, with a degree of confidence, a feel for the range of things within which the future might fall. With this information it might be possible, then, to examine various objectives, and plans for arriving at them, and consider the sensitivity or vulnerability of plans to conditions which conjecture suggests might arise. Although it has only been recently that this sort of futures-conjecture has been formally carried out as a precondition to planning, it has not infrequently been the case in the past that just such activities have been employed less formally. Clearly, without some concern for the future, and the more careful and exhaustive the concern, the more useful its result, then planning cannot be expected to be of value except by accident.

THE WORLD'S FUTURE PROBLEMS AND ALTERNATIVE SOLUTIONS

BY JOSEPH F. COATES

There is a lot said about the future, much, if not most of which is pessimistic or depressing. When one turns to prediction and forecasting the future, attitudes are even more negative. Many consider the future totally determined, threatening, and dangerous. Others who consider it determined, judge its study futile and pointless, at best, and depressing and foreboding, at worst. For others to anticipate the future is impious, sterile, arrogant, or a challenge to the gods, or fate. To look to the future, is to court disaster. Nevertheless, man everywhere is graced with that touch of divinity which drives us to order, to rationalize, to explain. The first intellectual achievement of mankind in forecasting was the prediction of the seasons and the understanding of the cycle of the heavens. That knowledge also spawned the false science of astrology. Reluctant as we may be to believe it, astrology is still thriving. "Hair" didn't invent the age of Aquarius, but only revived and publicized our latent hopes and fears that the future is determined and knowable.

Dreams, trances, the endless variations on the human person, patterns of the palms, the magic of numbers and numerology, the fall of the cards, have each led to the promise and the practice of foretelling the future.

Even if we set aside the plebian views of the ordinary man, the ignorant, the uninformed, the masses (which of course we can't do) and look at the attitudes of intellectual leaders, the future still does not often fare well. From Confucius, who said "study the past if you would divine the future" through Patrick Henry, who said "I know of no way of judging the future but by the past . . ." and on to the present, the idea has gradually grown that first the future stems from the past, but more significantly that it is not likely to be different. In the overall, the organic view that the future flows from the past has tended to promote a conservative view of the future reliving the past. The great invention of the notion of progress was introduced into the Western World by the Greeks. As later theocratized by Christianity, it has been borne as a dead weight on secular progress for most of two millenia. Only recently could a man dare say, both honestly and safely, as did Oliver Wendell Holmes, Jr., "I have always sought to guide the future—but it is very lonely sometimes trying to play God."

A recurrent theme in the Western World has been that of utopia, a term invented by Sir Thomas More, but certainly going back to Augustine's "City of God" and even earlier to the platonic dialogs. Moving forward into modern times, the great spate of utopian thinking in the 18th century, and the numerous experiments in the new world have tried to create a new life for mankind. But it seems to me that these were largely based on external standards. In the Christian communities the standard was living by the book. That basically called for the individual spiritual transformation of personal lives and the consequent transformation of society. Most of the utopian thinking, it seems to me, has focused on what the world should be like when men individually reform. More recently, particularly with the tremendous growth of science in the 19th century new waves of futurist thinking of a different sort, technological fantasies, science fiction, came on the scene. Jules Verne and H. G. Wells are the paramount example of that trend. Secular progress, technological revolution, peace as well as war, play their role in these fantasies. Opportunities and risks were clearly played off against each other.

More recently the tide of thinking toward the future has taken a downturn. Those great contemporary satires, "Brave New World, and 1984," engage our attention—largely because of the fears they hold out—much the way the palmist and the card reader engage our attention with more than a piquancy of fear. The thorough engrained negativism and fear of the future so prevalent among the intelligensia is nicely encapsulated by J. B. Priestley:

> Between midnight and dawn, when sleep will not come and all the old-wounds begin to ache, I often have a nightmare vision of a future world in which there are billions of people, all numbered and registered, with not a gleam of genius anywhere, not an original mind, a rich personality, on the whole packed globe.

PRESENT TRENDS IN FUTURIST THOUGHT

With the brief thumbnail sketch of the history of the future, let us turn toward present-day currents and crosscurrents in thinking about the future. Most active and most immediately fruitful use of future-oriented thinking is in the most crass, economically profitable ways, or at least in those ways which are most immediate to the satisfaction of short-term, private, and corporate interests. Weather forecasting we are all familiar with. Economic and market forecasting are a well-developed art. Demographic forecasting is now flourishing. In the last 10 years there has been an incredible spate of what has come to be called technological forecasting, namely the forecasting of developments in technology, and to some extent their consequences. To some substantial degree this reflects military initerest; but more generally, it reflects commercial initerest in anticipating future markets, future product changes, future developments, which may transform an industry. Much of the solid well-developed technology for forecasting is applied to the short-term, private, and economic interests of man.

Another trend results from the convergence of both pessimistic observations on the consequences of technology and optimistic aspirations for fulfilling its utopian potentials. The awareness that the world is awash with risks and crises—risks of war, risks of depression, risks of famine, disease, and so on—has driven us toward anticipating these events, analyzing the factors leading toward them and most significantly toward conscious attempts to control them. Another more optimistic drive reflects much the same origins but grows out of the enormous potential that man has not only made manifest but sees for the future, in the control of machinery, the control of energy, the manipulation of the physical world. These bursts of conjecture about where science and technology may take us lead inevitably to the desire to regulate and guide among the alternatives. Today, the most provocative, stimulating, and useful thinking about the future is not limited to the predictable futures but rather to the analysis and the laying out of factors determining alternative futures. Overlaying the view that there are alternative possibilities for the future is an even more basically new notion that man can influence the choice among alternatives. The normative view is we can choose among alternatives, and if not absolutely control, at least we can guide and develop our future. Denis Gabor contributed a new catch phrase to futurists: We can invent the future. Futurists are now prepared to go far beyond Oliver Wendell Holmes. We can quite literally invent the future, consciously set upon alternatives (some hitherto unthought of) start new trends, and consciously move mankind either in segments, or in the aggregate, in these new directions. So the great wave of the future in the futurist world is inventing the future and determining the future alternatives before us, selecting among them, and inventing the means and ways of getting there.

The critical issues in regard to the solution of the world's problems are the establishment of new institutional mechanisms and intellectual methods for approaching their solutions rather than the solutions themselves. Solutions will more or less flow freely forth in the proper institutional environment. The nearly infinite number and variety of solutions already proposed could be sorted out, evaluated, and acted upon only when the proper institutional mechanism are available.

If I may make a broad contrast, a movement away from Utopian thinking, which tells us what the world ought to be like, has been replaced with a growing attention to how do we get to the future? How do we get to wherever we are going? The necessary or parallel effort in the establishment of alternative goals and objectives is only beginning.

WHAT IS THE FUTURE?

Obviously the future is from this moment. But from the point of view of studying and manipulating the future, different intervals are important, depending on the interest, intentions, and capabilities. We are confronted by a series of conjugate relationships, that is relationships of the sort that are so interdependent that to vary one is to automatically vary the other. The most significant of these conjugate relationships is the exchange of reliability for time, i.e., temporal distance. All else being equal, the best predictions, the most reliable predictions, are those that are closest to us. The predictions that are most significant for guiding the future are those that are further away. One can strike a balance, however, between the reliability of the method of laying out alternatives and the time which one has available for influencing or choosing among them. This major set of interacting factors is also strongly determined by the methods used for forecasting the future and the reliability that can be placed in them.

Speaking in the context of foreign aid, Harlen Cleveland remarked several years ago that:

> We know in our hearts that we are in the world for keeps, yet we are still tackling 20-year problems with 5-year plans staffed with 2-year personnel working with 1-year appropriations. It's simply not good enough.

Cleveland, I think, reports a basic tendency in our American society—an almost total lack of experience in anticipating and planning for contingencies and goals a decade, much less a generation or several generations ahead. That dark observation is by no means all black. Some progress has been made in long range planning. Conservation, in setting aside national parks; the building of social security programs; and the design of bridges and other structures with calculable lifetime all show the capability to effectively deal with long-term fluid issues. But by and large our society is not one directed at dynamic programing, that is programing for change, running decades or more into the future. For the large-scale social planning, we must engage in, both on a national and worldwide basis, the best unit of thought is somewhere between 25–35 years. We can extrapolate many significant developments to that period. Yet is gives us enough time to consider alternatives and invent new means in dealing with them and to invent new goals and new objectives. Longer periods are important in showing both long-term advantages and long-term risks but these, of course, are always less certain since most of them are contingent on developments in the middle period. If one only addresses the issue of evolutionary planning for the future in terms of crises, one can perhaps more narrowly demark the critical intervals. John Platt, in what undoubtedly will be a classic article in the planning of science and public policy divides the future into intervals of 1–5, 5–20, 20–50 or more years. To each interval he assigns various phenomenon that he anticipates as coming to a crisis in that interval. Different crises will be upon us in different intervals, assuming nothing effectively is done to manipulate the future.

With regard to noncrisis planning to exploit new opportunities; i.e., planning directed at the manipulations of potentialities for a good new life, the situation is more open ended and unclear. Put simply, it is most difficult to identify future opportunities for the profound benefit or favorable alteration in human lives.

Most planning for the future, it seems to me, naturally focuses around crises for two reasons. Crises reflect present trends or an exaggeration of what we are already familiar with. From a more personal view, in general, we are pessimistic about the future or anticipate the negatives in the future more clearly (witness 1984) because we individually, either personally or vicariously, are aware of pressure points on our lives. We are aware of the abrasion of population density, of the effects of air pollution, of the risks to privacy, or the potential implementation of a police state. For many of us, I argue, the ideal life would be the relief of these pressure points— perhaps the return to a bucolic youth, the ability to travel, or to have these various pressures relieved. It is much much more difficult for us to anticipate what the optimistic developments might be—what a true transformation in the quality of life could involve or imply. Relief of burdens are easier to understand than is a major improvement or transformation in the quality of life. That intrinsic asymmetry in the ease of thinking about the future must be aggressively fought and overcome.

A recent incident may illustrate this. In speaking to a group of some 120 high school students taking a course in change I raised two questions designed to diagnose their attitudes. First, I asked how many thought the world would be a better place in 25 years and how many thought it would be a worse place. The answers were 12 to 1 that the world would be a worse place. The second question, while vague and diffuse, was nevertheless, I believe, instructive. I asked them to imagine that they had any thing or device at their personal disposal or available to their family or within 100 yards of where they then were available to them for their free use. The question was what might that device be that would totally transform the quality of their lives or the lives of their families for the good. There were only two answers out of 120 students. One thought that the poet, Allen Ginsburg, being close by would have this desirable effect and the other opted for a return to a life of bucolic simplicity.

In contrast to this they were overflowing with awareness and concern for several of the crises made prominent by recent publicity.

THE METHODS FOR STUDYING THE FUTURE

The methods for studying the future to a large degree depend on the aspect of the future considered. One can look at technological forecasting, weather forecasting, economic forecasting, demographic forecasting, political forecasting, and social forecasting, and find that the methods are applicable more or less across the board with different reliabilities and utilities.

The most common methods include:

Trend extrapolation;
Multitrend extrapolation;
Correlation;
Arguments from first principles;
Analogy;
Intuition;
Morphological analysis;
Model making;
Simulation; and
Consensus forecasting—the Delphi method.

Rather than go into a discussion in each of these methods it would be more useful to dwell on the one method which is potentially particularly valuable for an extremely wide range of assessments of future conditions, developments, goals and objectives. That method, the Delphi technique, also lends itself to the integration of nonexpert with expert judgments and opinions.

Before going into a discussion of Delphi it might be appropriate to mention that most general systematic attempts to examine the future afford additional benefits which are distinct from the precision and reliability of the forecast. These heuristic and didactic benefits include: First, the demand for making assumptions explicit; second, having made the assumption explicit, they tend to promote two subsidiary benefits, namely the sharing of the explicit assumption and the identification and divergent assumption and the effective, conscious, systematic resolution of consequence of that divergency. An additional benefit from the systematic attempts to examine the future is almost always a broadening of the range of alternatives being considered. Complementing that is a general sensitizazation to complexities and interaction of factors influencing alternative future. Finally, a more diffuse benefit is the general discipline in thinking demanded by a comprehensive, exhaustive, and systematic analysis, and synthesis.

THE DELPHI TECHNIQUE

The Delphi technique is an attempt to improve the utilization of experts in analysis, evaluation, and forecasting. It uses informed intuitive judgments in a format other than the committee meeting.

The panel—or committee approach to problem analysis has a number of drawbacks. A major defect is that most committees do not make either their reasoning or their assumptions explicit. Committees also tend to operate by seeking a consensus among the views of their members; thus many minority views and alternatives tend to get buried before a final report is written. Often a bandwagon syndrome takes hold, putting pressure on members of a panel to go along with a majority view. In many instances an authoritative (or vocal) panel member can drive the panel into a bandwagon. Finally in a committee meeting, it is often difficult for the individual to change his mind once a position has been taken.

Most of the drawbacks of committee operation are due to the interaction of the personalities and psychologies of the commitiee members. This implies that a better situation for the utilization of the experts would be a panel meeting without face-to-face confrontations, but with adequate communication and interaction (feedback) between the individuals involved. Note that mere elimination of face-to-face contact alone is not sufficient.

A new approach—the Delphi technique—has been suggested to overcome the difficulties discussed above. In one sentence we might say that in its simplest form the Delphi technique is a carefully designed series of individual interrogations (usually best conducted by questionnaires) interspersed with information and opinion feedback. We will explicate the technique with the aid of a simple illustration.

Suppose a panel of experts is convened to estimate the year by which the employment rate among the black population will be the same as that for the white pouulation. Each panel member responds individually—say by questionnaire—and gives an initial estimate (guess or judgment). A central person running the panel arranges the results of the first round of responses in order from highest to lowest and determines the median and the interquartile range.[1]

The second round begins with the results of the first round being sent to each panelist. The respondents are then asked to make a new estimate. If their estimates are outside the interquartile range, the respondents are asked to indicate why their judgments were so different from the majority judgment of the group.

This last step forces those with extreme views to either stand behind their judgments—with explicit reasoning—or to move into the majority's range if no strong convictions are held by the respondents.

In the next round, responses (now spread over a smaller interval) are summarized again, and all the respondents are given a summary of reasons offered by those who have taken extreme positions. Another revision is requested based on the reasoning presented. A respondent whose response is still outside of the interquartile range is required to indicate why he remains unconvinced by opposing argument. In a fourth round these criticisms are resubmitted to the entire panel and a final revision of estimates is requested. The median of these responses could then be taken as approximating the group judgment or more significantly, the range of responses may be presented, representing a ordered weighted series of judgment, so that one now does not come up with a single answer, but a set of answers with associated priorities.

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[1] The interquartile range is the interval containing the middle 50 percent of responses.

In the majority of the cases where the technique has been applied there seems to be a convergence of opinion and a narrowing of the interquartile range. In some instances a polarization around to a single answer has been observed. In other case two or even three modes or peaks may result.

The working of this Delphi technique depends on a number of factors. In the first instance there is always the question of who is an expert when a panel of experts is convened. Little advice can be proffered here on that topic. The only useful hint in the direction of distinguishing good experts from bad is to ask for self-evaluation within the context of the Delphi game. If the responses to a particular question are weighted to attach more significance to those answers coming from people who indicated (in the private context of the Delphi technique) that they were more expert in some areas than others, it might be possible to converge to a more accurate response.

Of major importance in the operation of the panel is the communication aspects—interaction and feedback—of the total panel are kept as free as possible. Since experts in different disciplines use different languages, the collocation panel, that is, the man or group running the Delphi must phrase its questionnaires and models so that all the respondents understand them.

In conclusion it might be said that the Delphi technique is a rational way of obtaining the collective judgment and opinion of a panel of experts, uninfluenced by the psychological obstacles that influence conventional panel meetings.

A panel of 10 or so people can be run by one man. As rule of thumb figure 2 hours work per panelist per complete Delphi. Expired time for Delphi depends on speed of processing answers and delays in sending them to the panel.

Delphi Technique: An Example

We shall ask a group of 11 (for example) experts the following question: Estimate the year by which the unemployment rate among U.S. blacks will be the same as that among the white population.

First round.—The control (review, collocation) group distributes the question to the 11 respondents and receives the following replies, arranged chronologically:

1972, 1974, 1975, 1978, 1982, 1984, 1989, 1993, 1995, 2000, 2005

Q_1 $M = 1984$ Q_2

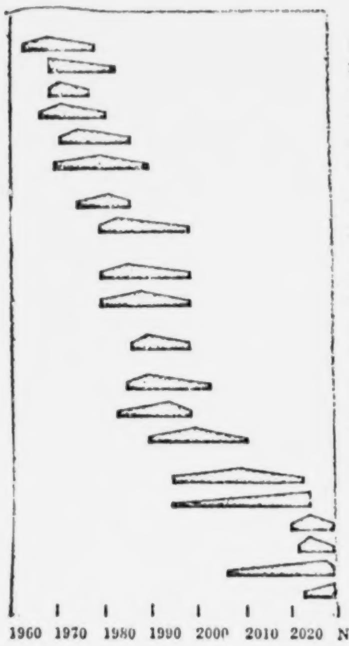
Second round.—A distribution summary consisting of the mean value ($M=1984$) and the interquartile range ($Q_1Q_2=1975–95$) is put together by the review committee and distributed to the respondents with a request for possible revisions in their individual answers. If a respondent's estimate (first or second) lies outside the interquartile range he is asked to state briefly his reasons why the answer should be higher (lower) than the 75 percent majority opinion given in the first round.

Thus, for instance, the man who guessed 2005 might indicate that he believes that it will take two generations to raise black educational opportunities to the point where more jobs are available, while the man who guessed 1972 might be looking toward an economic expansion following a (hypothetical) solution to the Vietnam war.

Third round.—The results of the second round are summarized as above and distributed. In addition, the reasons for raising (lowering) the values given in round two would be documented. Then the respondents are asked to examine the new estimates and the arguments and to revise (if they choose to) their answers. Again, if an answer is given outside the second round interquartile range, documentation is requested.

Fourth round.—Submit to the experts the interquartile range of round three and counterarguments given in that round. Ask for one final revision.

The median of the responses to round four could be taken as a group consensus as to what the answer shoud be.



A DELPHI CONSENSUS ON SCIENTIFIC BREAKTHROUGHS

1. Economically useful desalination of seawater
2. Effective fertility control by oral contraceptive or other simple and inexpensive means
3. Development of new synthetic materials for ultralight construction
4. New organs through transplanting or prothesis
5. Reliable weather forecasts
6. Operation of a central data-storage facility with wide access for general or specialized information retrieval
7. Implanted artificial organs made of plastic and electronic components
8. Widespread and socially widely accepted use of nonnarcotic drugs (other than alcohol) for the purpose of producing specific changes in personality characteristics
9. Controlled thermonuclear power
10. Economically useful exploitation of the ocean bottom through mining (other than offshore drilling)
11. Feasibility of limited weather control, in the sense of substantially affecting regional weather at acceptable cost
12. Economic feasibility of commercial generation of synthetic protein for food
13. Biochemical general immunization against bacterial and viral diseases
14. Feasibility (not necessarily acceptance) of chemical control over hereditary defects by modification of genes through molecular engineering
15. Biochemicals to stimulate growth of new organs and limbs
16. Chemical control of the aging process, permitting extension of life span by 50 years
17. Breeding of intelligent animals for low-grade labor
18. Control of gravity through some form of modification of the gravitational field
19. Feasibility of education by direct information recording on the brain
20. Use of telepathy and ESP in communications

THE DULLNESS OF FORECASTS

By and large forecasts of any of the sorts mentioned are pretty dull stuff. The dullness generally results from one of two deficiencies.

First, they often ignore the human dimension, in particular, the ingenuity implicit in human behavior. Scenarios of the future usually offer characters who are little more than cardboard cutouts. Perhaps you have read the science fiction classic "Fahrenheit 451," or have seen the movie made from it. In spite of the color and the drama and the excitement, the important political message, the characters are as lively and real as the ads or a cornflake box. This is also true of 1984 in Huxley's "Brave New World." I challenge the reader to remember the names of one of the characters and give a five-line character sketch.

The other source of dullness in many future forecasts is related to the first, but reflect an inadequate elaboration of the technological dimension. Little of the futurist literature, even the best of it, gives attention to what I would call secondary or derivative consequences, even derivative technological consequences. Now, what do I mean? Let's imagine for a moment that we were forecasters in the year 1890. The horseless carriage is coming along and we must anticipate what it might, could, and ought to do. Who at that time would have anticipated that the horseless carriage would transform the sexual mores of the United States, or that it would lead to a new attitude toward the land use that every family is entitled to a quarter acre of greenery. Who would ever have thought that a fifth of the United States would change residence each year, or that the average urban commuter would travel 5 miles a day to work. The profound consequence for leisure as well as employment were unthinkable. Who would expect that the automobile would open up skiing, boating, golfing, a range of leisure activities covering an area of conservatively 10 miles, and perhaps more generously 50 miles, for the average citizen. Who would have ever thought that the car would replace the hayloft and that the range of friendships, the network of relationships, would spread out through a population of literally hundreds of thousands of people and that we would be able to pick and choose at remote distances whom we have contact with. Who would have thought that 10 percent of the GNP would directly be attributable to the automobile and its collateral industries. It is this lack of attention to secondary and derivative consequences which is perhaps the most conspicuous weakness in future thinking, whether it is the future of optimism, a future of pessimism, or a future of aggressive control. Future thinking tends to ignore the protean flexibility of man in the face of both adversity and opportunity. Our capability to compensate for deficiency, to make do with substitutes, our built-in inventiveness in exploiting new applications, new extrapolations, in whatever is offered to us is a basic collective strength for survival.

THE ENEMIES OF THE FUTURE

As I mentioned above, the future has its enemies, those who see its study as godless, as futile, as forboding. The future also has more dangerous enemies—enemies who have grown in an atmosphere of dissatisfaction with what science and technology is alleged to have done to us. We are now caught up in a wave of the most fundamental sort of negativism, a wave of antiintellectualism which may well endanger the future. In the short run it can and is creating an enormous disturbance. As background to that, let us look briefly at current trends in three fields: Ethics, ecology, and physiology.

SITUATION IN ETHICS

For a very long time, and for some of us today, education has had a basically theologically grounded ethics, an ethics of "never" and "ever". That ethic said you must forever be true to your flag, forever love your country, never steal, never lie, never hop into bed with anybody who is not your spouse, and so on. That categorical ethical thinking is reasonable and appropriate for a static or slow-evolving society, in which each generation is overwhelmingly like the past. Then the accumulated experience of man in dealing with social problems may be usefully codified and frozen into categorical canons. But as our private worlds expanded, and we became not only physically but spiritually mobile, personally more versatile, more experienced in the literal sense of having been exposed to more experiences, the old canons function less satisfactorily. Of course even the scholastics recognized some limitations in ethical categoricals, and subjected them to mitigating circumstances and various kinds of scaling. In the traditional medieval ethics, the seriousness of an evil act or sin, as they called it, was determined not only by the intrinsic importance of the act, but by the intention behind its performance and knowledge of the outcome. In the 18th century, Jeremy Bentham attempted to develop an ethical calculus which would allow a finer determination of rights and wrongs. But basically the world continued through to the present bound by categorical ethics which have become more and more dissonant with the issues of the times. The present trend, however, is toward recognition of need for flexible value responses to complex situations. That trend has led to what is now called the situation ethics. The curious and interesting thing about situation ethics is that it never tells you what to do. It only sets a goal; for example, that you don't exploit others or that you behave in a way to optimize overall values. But it throws on the individual the enormous intellectual burden of thinking through all the ifs, ands, and buts of every situation and coming to an optimal personal solution.

ECOLOGY

There has been a parallel view developed with regard to nature. Some, with our ancestors, hold the simple-minded view that nature is so relentless and so universal that our small impact on it, not only never amounts to much, but requires continual reinforcement in order for us to hold our own. The ghost town of the recent West show what can happen when man abandons his struggle against nature. The discovery of the Mayan temples, and the ruins of the Middle East, announced what nature is ever ready to do to the works of man if she is not constantly struggled against. Of course, the struggle has also been noted less frequently as going the other way. The lush wheat fields of North Africa, in historical times, turned to desert. The tree-covered hills of Greece and southern Italy become barren and sterile. Even in ancient times, the irreversible result of man's predatory behavior has been seen. But by and large, nature has been considered something overwhelming and powerful to be struggled against. With the growth of the detailed understanding of the interactions of organisms with each other and with the environment, elimination of whole species, and irreversible trends in the environment, a new science of ecology has grown up. Again, the hallmark of ecology is that everything in nature, is part of everything else. In order to understand the part, one must understand the whole and how parts interact. But there is a stream of pietistic flatulence that also tends to run through thoughts about nature. That is basically anti-intellectual. For example, William G. Pollard wrote:

> One hears much these days, and gratefully so, about conservation of natural resources, environmental health, pollution control, beautification programs, wilderness and wildlife preservation. This is of course all very necessary. But almost completely lacking from all such discussion is a sense of the sacredness and holiness of the earth, or of the awful dimension of the sacrilege which man has wrought in spoiling it. What is needed at this juncture more than anything else is a theology of nature.

By and large, however, ecology has tended to grow as an important new science. It is biology at a higher level organization than individual organisms. As such it presents an interesting historical parallel to the growth of physiology.

PHYSIOLOGY

Now let us turn to physiology. The history of physiology shows development first of recognition of isolable portion of the organism which could be grouped under the notion of a system—the circulatory system, the digestive system, and so on—and then the understanding of how the individual system works; and then how it is interrelated to other systems; and finally, the development of the notion of the organism as a total entity in which the isolable systems are only partially, not fully, isolable from the total system.

Much of the rest of the intellectual efforts of mankind, however, have not been directed at this kind of physiological thinking, but rather, we find trends in the other directions. The current trends in ethics, the current trends in ecology, however, are much in line with the development of physiology. Physiology is the model for the new class of thinking; a new approach to complex problems. The names developed for the new approach, system sciences and systems analysis, came into scientific jargon since World War II. It is also known as operations research and operation analysis. It is in the elaboration and application of this notion of systems analysis that much of the valuable intellectual efforts of the next few decades will be. But what do we mean by system?

SYSTEMS ANALYSIS

The hallmarks of a system are roughly five. First, it is a collection, an aggregate, a group of some sorts of things, of people, individuals or devices, which are related in a way. Secondly, the way in which they are related is called their function, or their mission, or the role, or the job that they are to perform. The third component of a systems analysis is some measure of the effectiveness of the system with regard to its functions. These measures of effectiveness of course are basic to being able to evaluate the efficiency of the system, and its efficiency, and effectiveness compared to alternative arrangements or alternative systems. The fourth component is the possibility of alternative systems. The fifth component, perhaps the most striking and basic novelty in systems analysis, is the introduction of a mathematical model. That is, means by which the measures of effectiveness and the performance of a system can be handled in quantitative, graphic, or other mathematical means to allow for reliable analysis, variations in the system, and assessment of the introduction of novelty by innovation. Systems analysis is catching on in many areas of technology. It is common in military technology and becoming common in industrial technology, highway planning, housing, and a variety of technical areas. And it is a basic if not principal tool, I believe, for dealing with the problems that the anti-intellectual strain in our community is so frantic about. The anti-intellectuals blame too much science and technology for air pollution, water pollution, an urban environment infested and plagued with countless ills, and an alleged, but almost certainly false, declining quality of life. The quality of life, even in the suburbs, among the middle and prosperous classes, is constantly confronted by displeasures, disutilities, and frustrations. Overlaying that, we see a growing roster of large scale risks—irreversible pollutions of the arctic zones, and the possible melting of the ice caps, the expansion of deserts, the destruction of forests, the loss of esthetic and natural wonders, the flooding river valleys or cutting the giant redwood. The apparently relentless march of technology is seen in the minds of many as the cause of all this. And in some sense it is. But, the solution which many offer is sterile, futile, or destructive. In condemning technology as the source of our ills, the alternative most frequently hit upon by the concerned but uninformed is the rejection of technology and a dramatic simplification of human life. Witness, for example, the rural and urban communes. These people are prepared to live parasitic existences in society because society is so technologically advanced that it can, if not afford, at least tolerate, such a parasitic behavior. Yet they claim this is the way of the future. It can't possibly be the future and still have human survival on the scale and quality that we have even today.

This movement is dangerous, not only because it is destructive, but it is dangerous in the same way that the revival or growing interest in astrology and voodoo is dangerous. It is a turn away from the substantial and looks to the insubstantial for the solutions. It turns away from the real cause and mindlessly trys to find a cheap substitute. Participatory democracy may have a place in establishing goals, but it will never deal with the problem of blowing the electrical distribution network in New England. Participatory democracy may lead to deciding whether the Chesapeake Bay ought to be clean, but it will never deal with the earthy issue of disposing of the sewage of X million people or the industrial waste of 1,000 manufacturing plants. Participatory democracy may tell us to save the redwoods, but it will never develop a fungicide, nor will it ever commune. The fundamental solutions to the future of the world's problems is in developing and accepting systems analysis—or as I would prefer to call it—a physiological model of the world in which all parts are recognized as interacting with all parts. The systems which are isolable for analytical purposes must always be referred back to the total well being, to the total function of the entity.

Where is the optimism with regard to handling the future problems of the world? Well, I think that there are at least two interesting developments here. One is the proposal by Victor Ferkiss of Georgetown University that we need a new kind of man. Ferkiss calls him technological man; namely, the man who is capable of understanding technology, what it can and cannot do, and at the same time, is competent in understanding the human affairs of the world, the political and social drives, needs and limitations. Implicit in Ferkiss' argument is the notion that we need more relentless application of science and technology. This notion has developed even more explicitly by John Platt in his article mentioned earlier, "What We Must Do". He argues there that we have to put the future, the crisis that we face, on the same footing that we put submarine warfare in World War II or the problems of nuclear energy. We must not rely on inadequate funding, pip-squeak organizations, and isolated efforts to solve our impending crisis; but we must marshall massive interdisciplinary teams that will attack hundred-billion dollar problems on a scale that hundred-billion dollar problems require. My basic argument is that we need more science, more technology, more firm intellectual effort in wrestling with the future, and less handwringing, less teeth gnashing, and less flatulent piety; less profanity, and more profane study. We must reject the notion that nature has any value, any claim, or any capital letters. Relentlessly adopt the view that nature is a tool at the hands of man. Nature is man's resource, to be manipulated in whatever way that men collectively deem to meet their short and long-term interests. Man is the measure of all things. How could it be otherwise?

MAN'S LONG-RANGE GOALS

Going along with the problem of how we have to deal with the future, a systems analysis immediately demands attention to the question: What should we be driving for? There have been a group of interesting ideas developed with regard to mankind's search for long-range goals. Perhaps the most elaborate of these, and perhaps one which has little practicality, is the notion of worldwide discussion groups to allow people to talk out their goals and their objectives. The basic difficulty that these notions face is the false belief that people have or can formulate long-term private or public goals. I think that one might be on a safer ground arguing that by and large people don't have either private or public long-range goals; although under stimulus, they may develop one which they haven't thought through or they may accept one which is offered to them. I think it more fruitful to view long-range goals against a background of public permissiveness. As Goeke pointed out in a recent address to The World Future Society, that when the space program was undertaken in the early 1960's, the public opinion surveys showed no great enthusiasm for it—only some 10 percent of the population assigned it a top priority. Our political leaders judged that a moon landing was an important goal toward which public attitudes were as suitably permissive. In contrast to that, Goeke pointed out the public would not permit Roosevelt's attempt to pack the Supreme Court. So against this background of permissiveness which is extremely broad and prohibitions which are extremely narrow, it is probably up to a different group in the communities—the intellectuals, the thinkers, the propagandists, the future-oriented—to propose, analyze, and implement short-, medium- and long-range goals. There are some goals that we could universally agree upon. One of these perhaps as proposed explicitly by Platt is that we avoid a nuclear holocaust which would so completely change the game as to put us in a different world. A second general goal proposed by Frank Hopkins, Washington chairman of The World Future Society, is that we ought to have a goal, at least let's say for the next generation or two, that would leave open the opportunity for maneuver in the future. In other words, whatever basic goals are set, they ought to permit subsequent future goals to be set. Goals ought not foreclose alternatives that may in the future be useful.

A most promising national development in future thinking and planning is the establishment of the Goals Research staff at the White House. It is charged with developing long-range and intermediate-range goals for the United States. What course their work will take, its effectiveness, political viability, and even its intellectual aggressiveness all remain to be seen. Another promising development with regard to the future is the spawning of future-oriented societies and institutions around the world. There is a future society of Japan. There are the Futuribles in France. There has been a recent international symposium in Japan and one in Germany. The World Future Society, as you know, has existed for several years in the United States. There is the recently formed Institute for the Future. In our own country, there are 10 or 12 universities now offering courses in the future. The first step into the futurists future, becoming systematically aware of what it might be and what we might do about it, has been taken.

PERMANENT DISASTERS

Until quite recently historians and social thinkers might well have argued, both historically and conceptually, that there could be no long term permanent disaster. Disasters and catastrophes were essentially seen in parochial, geographic or temporal perspective. Even such a pervasive phenomenon as the Black Death did have beneficial influences in the economic development of Europe. In recent years, however, that situation has clearly changed. There is a possibility of permanent disasters that might forever, or for at least the indefinitely long future, adversely influences the general development of mankind. Among these are:

Nuclear war;

Contamination of the atmosphere by carbon dioxide and a major shift in the earth's heat balance; and

The induced melting of the polar ice caps, with the consequent flooding of most coastal regions.

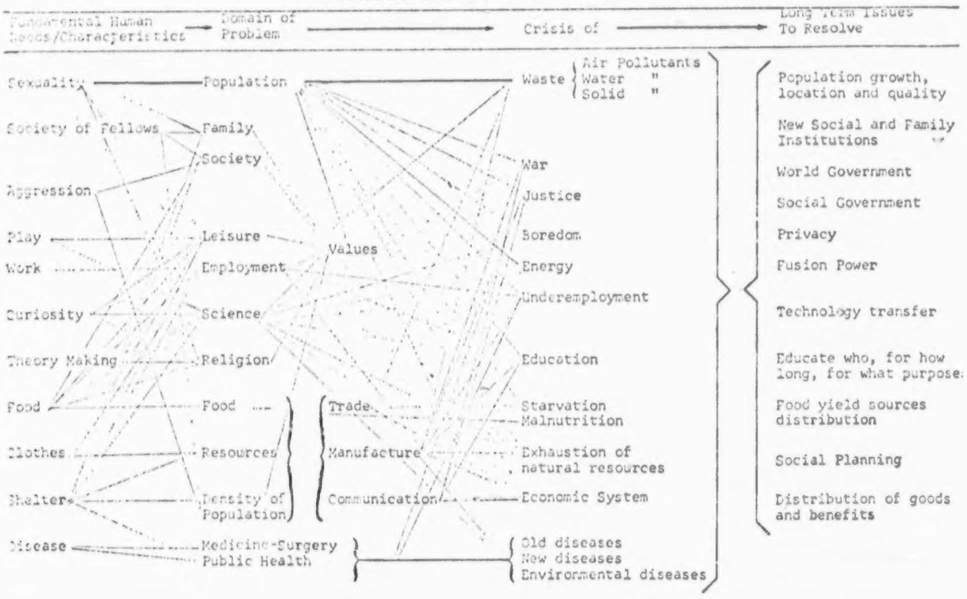
OTHER PROBLEMS OF THE FUTURE

Of course, there may be other permanent disasters potentially before mankind. But they have not been as definitively identified and as widely conjectured about. At this point it may be appropriate to attempt a preliminary and systematic sketch of other major inevitable problems of the future—inevitable in that they relate to fundamental features of the human condition. As a consequence, they must be dealt with in fundamental terms, i.e., by major reordering of social institutions and private and public attitudes.

Table I, I believe, presents many of the major categories of problems. The first columns are a list of fundamental facets of human behavior or fundamental needs which must be satisfied by one means or another. Column two is the domain or area resulting from these fundamental human needs in which a crisis may be anticipated. The third column indicates the major crises. The fourth column is the principal issue to be addressed in determining a satisfactory future for mankind.

Obviously, Table I is a mere sketch of the complex of future problems. The interrelated lines attempt to show how the several factors influence each other.

TABLE I. PROBLEMS OF THE FUTURE


Fundamental Human Needs/Characteristics
Domain of Problem
Crisis of
Long Term Issues To Resolve
Sexuality
Society of Fellows
Aggression
Play
Work
Curiosity
Theory Making
Food
Clothes
Shelter
Disease
Population
Family
Society
Leisure
Employment
Science
Religion
Food
Resources
Density of Population
Medicine-Surgery
Public Health
Values
Trade
Manufacture
Communication
Waste
Air Pollutants
Water "
Solid "
War
Justice
Boredom
Energy
Underemployment
Education
Starvation
Malnutrition
Exhaustion of natural resources
Economic System
Old diseases
New diseases
Environmental diseases
Population growth, location and quality
New Social and Family Institutions
World Government
Social Government
Privacy
Fusion Power
Technology transfer
Educate who, for how long, for what purpose
Food yield sources distribution
Social Planning
Distribution of goods and benefits

A discussion of any one of these problems, much less the total complex, would be far beyond the scope of the present paper. As a preliminary and therefore tentative roster of major issues before mankind it is subject to a great deal of expansion, reordering, and modification. Harking back to some points already made it should be clear that these issues face all mankind not individually but in a systematic interrelated manner. Consequently, the solutions to them are not likely to come about by partial approaches, independent or private action since the basic issues exceed the scope of private initiative, the private action. Managing the problems implies a conscious systematic analysis of the total interrelated complexities; the examination of alternative strategies for dealing with them, with heavy emphasis on more technology since it is ultimately only through applied science that man will be able to effectively control nature. Adopting a physiological model of the issues drives toward new emphasis on the neurological aspects—the aspects of societal self-awareness, self-control, self-regulation of the total system. The anticipated critical issue of world government, social control, social planning, and equitable distribution of resources especially illustrate this. If we are to effectively deal with mankind's problems, more regulation in the cybernetic sense of control with feedback is required. Solving these problems also implies a need for a new and greater emphasis on effective integration of individual and collective goals, desires, and prohibitions into the management of the world. Consequently, in broad outline, if we are to survive as both human and humane, the growing technological requirements for self control and self regulated society with the implications of central planning will put a profound new need on the maintenance of democratic institution, perhaps some new form through institutional groupings.

THE PEDAGOGY OF PLANNING: DEFINING SUFFICIENT FUTURES

BY STUART A. SANDOW

Preface

Long-range goals, a primary article of faith in private and governmental planning today, exert such complex effects, cost so much to formulate, conceal so many vested interests under the rubric of catchy goal statements, that the strategies which will be used to attain the goals—as well as the social groups they will affect—are seldom clear to the public. Complaints of the affected publics are seldom addressed or examined.

The citizen is presently asked to support a goal set for some distant moment, without a sense of the impact of intervening events on his own life, and without a feeling that he has any control over what will occur. This essay attempts to show the reader that he can trust his own judgment. It offers significant questions he can address to planners in order to determine what inputs they examined in setting their goal; the set of questions supplied here can be seen as weapons in the hands of the citizen. It is often forgotten that the planner is also a citizen, equally effected by goals beyond his control.

This essay questions expertise about the future. It outlines, challenges, and redefines several planning methods. Overall, the essay tries to define the hithterto imprecise, and to suggest a more generous framework through which to focus thought about the future.

Further, this essay suggests a pedagogy to direct the use of futures terms which currently have no fixed meaning. A rationale for a comprehensive training program for planners is implicit, a program which emphasizes not techniques but broader moral understanding of the concerns implicit in the broad-gage planning of new environments.

> Until the people are solved somehow
> For the day and the hour,
> Until then, one hears
> "Yes, but the people. What about the people?"
> Sometimes as though the people
> Is a child to be pleased and fed.
> Sometimes as though the people
> Is a hoodlum you have to be tough with.
> But, seldom as though the people is a caldron
> And a reservoir of the human reserves
> That shape history.
>
> —Carl Sandburg

Introduction

Presumably men engage in forecasting for reasons beyond the formulation of forecasts themselves. Usually, forecasting absorbs men because it aids their planning. How can forecasting methods be used to influence the planning process? In short, how can citizens use them as a kind of pedagogical system to affect the ways planners think about the future? How can the future-perspective affect the planning process? These problems are at the heart of this inquiry into the logic of nondata based methods of thought.

A further purpose of this document is to isolate from those methods and catch phrases men use to think about the unknown future the questions they ask themselves, and the nature and uses of their responses when used in planning. This essay is most concerned to develop a way for planners to address the future without forgetting that the future is the future of individuals—of people. It argues the citizen's important role in futures planning, and supports sustained divergence of opinion in the planning process, rather than consensus as the desirable outcome of the process.

Furthermore, this essay quite specifically focuses on institutional planning. Our principal problem will be to discover (or perhaps to construct) a pedagogical process that uses the methods of forecasting, but not merely to generate forecasts, rather, to plan. In short, is there a structure of forecasting methods which can be converted into planning methods? The adoption of forecasting methods is studied here, not so much to know the future as to participate more effectively in its development.

While this discussion details several methods and sets out their application in a simulated environment, it does not describe a simulation. While simulations usually ask individuals to play others' roles, in the environment described here, individual participants play themselves *at various moments in time. Secondly, while simulations usually pit the player either against an environment or against other players in a win-lose setting, in order to see how the environment behaves when manipulated, here the purpose is to help the individual to examine how* he *will behave in certain environments.*

The following study uses a future environment constructed by participants, the parameters of which constitute rules for play. Secondly, the simulated environment described here exists to test alternative plans for the future.

* * * * * * *

The acceptance of certain arguments is a precondition to this discussion.

WHAT IS THE NATURE OF INFORMATION THAT IS USEFUL TO FUTURE PLANNING?

Extrapolations and manipulations of data are useful for predicting and forecasting. But alone they do not yield decisions in the planning process. Policy and planning imply a concern with goals that is typically omitted from such manipulations of data (Holland and Gillespie).

WHAT IS A GOAL?

> Goal statements reflect beliefs: it is possible to believe what is false but not possible to know what is false . . . Although belief is a part of any knowledge claim, knowledge is not necessarily a part of belief claims . . . There are vast

> areas of human concern which are commonly understood not to deal with knowledge at all but with insight, wisdom or simply conviction . . . Beliefs cannot be assessed in ignorance. They cannot be assessed until it is understood how it is that men who have held them have found them reasonable to believe (Green).

On the one hand, we face a lack of data to which we can attach truth or knowledge claims; on the other hand, we confront goals that themselves reflect beliefs—beliefs that need not carry a condition of truth.

WHAT HAPPENS WHEN WE QUESTION THE FUTURE?

Questions we ask about the future are of a type whose answer cannot be known to be true at the moment of utterance. Utterances do not fulfill the criteria for answers because they do not satisfy the truth condition imposed on answers. In this pedagogy, I have called all answers to future questions responses, arguing that a response is an acceptable reply with a logical and believable connection to the question but without necessary truth. This distinction has the pedagogical value of freeing the individual to trust his response almost as a belief, without having to contend that it is true.

IF QUESTIONS ABOUT THE FUTURE DO NOT GENERATE ANSWERS, HOW CAN WE PLAN AT ALL?

By suspending our disbelief (a cinema concept) and temporarily trusting our conjectured responses enough to treat them as tentative truths, we can proceed to plan.

In effect, we build bridges toward future actions by trusting (as we must) the incomplete knowledge we have in the present. It has often been noted (by policy planners if not by physical planners) that one never has enough knowledge on which to base a decision at the moment such decision becomes imperative: if one waits until knowledge is sufficient, the opportunity for effective decision has often slipped away.

WHAT IS THE NATURE OF EXPERTISE ABOUT THE FUTURE: DOES IT EXIST? IF SO, WHO HAS IT?

The further into future time we extend our concern and attention, the more unknowns we must face in conjecturing the future possibilities that demand examination. The parameters of the short-term future can be fairly accurately forecast. However, technological innovations not yet conceived will rupture these forecasts. Unlike the short-term future, the long-term future cannot be perceived as a continuous extrapolation of the past in quantifiably larger or smaller terms. Rather, it must be perceived as an array of possible futures. New unknowns in technological innovation have provoked the pursuit of surprise-free future projects and the casting of alternative future conjectures—conjectures that are only limited by man's perception of what could be.

Men try to delimit a plausible future when they pursue goals. All goals are not-yet-occurred states of affairs that are sought by some individual or group. The key argument underlying this essay is that the strategies used in pursuing goals and the groups who chose them need to be examined as rigorously as the goals themselves.

* * * * * * *

Men conceive of the passing of time, both past and future, as aggregate concepts. The past and future are generally disaggregated, for planning, into short-term and long-term periods. The short-term—or more recent—past is examined with the set of techniques appropriate to it—usually by direct examination of the hard evidence which the event has left behind. The long-term—or more distant—pasts are examined with techniques appropriate to them. However, the subjectivity of the historian is imposed on whichever accounts he chooses to believe.

Similarly, the methods for examining the short- and long-term future differ. The short-term future can be rather clearly specified, and its parameters detailed by the extrapolation of the hard data (trends, etc.) available to short-term planners. Through the experts who interpret that data, competent synthesis can delimit options. These data based methods include PERT, PPBS, and the economic and demographic data collected by statisticians over the past several hundred years. In addition, men in the vanguard of their own fields can be interviewed.

The long-term future offers no hard data, and expertise and objectivity toward it are difficult to recognize. The further into the future men project their concern, the greater number of impacts their actions appear to have. The unthinkable events that one cannot conceive through extrapolation of the present become visible and plausible when conjectured into the long-term future.

Processes exist for systematically examining these several alternative long-term futures. These might be called nondata based methods. (I have coined this term to separate testable knowledge from untestable belief.)

The methods we will consider seem to consist of an array of specific questions which long-term planners confront in their attempt to examine the unknown long-term future. When examined as an array of specific questions, these methods show a natural logic. They seem to focus the long-term planner's attention toward an ever-expanding perception of alternative moments in time.

Responses to questions about the long-term future—like those of the long-term past—are more subjective than those for the short-term. This subjectivity reflects personal perceptions, beliefs and values. Men may attempt to be completely objective, but their objectivity is submerged in their subjective decisions about what they will try to be objective about. The responses long-term planners generate to the questions they ask of the long-term future are value-laden, reflecting their own perspectives.

Long-term planning is concerned with developing problems—problems that will not exist for years to come, if at all. These long-term conjectures are not stated in terms of if-only goals and are not wishes for a better now.[1] However, they often reflect aspects of now continued into the future unchanged, as if the long-term planner ignored the intervening years and the existing forces which are basic change agents in human behaviors, desires, values, and beliefs.

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[1] If only the war were over, I wouldn't mind being drafted now.

This incomplete sketch of a long-term future results in part from:
—an incomplete examination of probable intervening events
—an attempt to develop only an isolated piece of the future
—an inability to examine the moment of the long-term goal's attainment from an appropriate role—a role in that future "present" moment and all the moments that will exist in the interim
—a lack of knowledge, or "memories," of the future from which to draw the analysis and synthesis of those futures.

This essay examines six methods to help long-term planners assess their strategies and goals for the long-term future. The six methods are: Delphi, Future Histories, Scenarios, Value Shift Analysis, Future History Analysis, and Cross-Purpose-Cross-Impact Matrices. The synergistic use of these nondata based methods (which serve to focus individuals' attention on an array of questions) will limit the effect of the predictive flaws suggested above.

Consider an institution with a long-term goal of a sort that, if attained, would seriously alter the institution's composition, its community role, and the way it is viewed by the society at large. Within the institution, a planning department is trying to reach a goal by specifying certain strategies and urging certain actions.

The pursuit of a goal that will alter the make-up of the institution will affect several populations in several ways. The planners see the several affected populations as people who have relevant information useful in fixing strategies and determining the values they may entail. While a strategy is pursued, extraneous events will certainly occur and may or may not affect the strategy or the goal itself.

The process of collecting, tabulating and assessing that information so that the long-term planner may use it is carried out systematically by collecting bits of information focused on certain topics. The self-interested opinions and information of individuals both within and without the institution may supply a plausible, probable internally consistent environment against which the long-term planner can assess his strategy alternatives. For planners to examine their choices of strategy, they must suspend their disbelief.

DELPHI: A TOOL FOR DEVELOPING FUTURE ENVIRONMENTS

The Delphi technique elicits and refines the opinions of a group of individuals. The individuals remain anonymous to each other, their opinions are continually refined and reiterated, and feedback to participants is controlled. The process is believed to produce either converging group consensus or the polarization of views.

A variant of the panel or committee approach for arriving at consensus or majority opinion, the Delphi technique eliminates the face-to-face confrontation of a panel or committee. Presumably, it avoids specious persuasion, individual unwillingness to abandon publicly-held positions, and the bandwagon effect of a majority argument. For direct discussion, Delphi substitutes a series of carefully controlled questionnaires that report back edited opinions and new information to participants, while they work in privacy and react to successive inputs. A committee or panel report is replaced by tabulated data from the respondents, from which Delphi coordinators draw their interpretations and analyses in order to arrive at a series of forecasts, opinions, and occasionally scenarios instead of an expository report (Dalkey, Gorden, Helmer).

In spite of a number of weaknesses in Delphi, we might reasonably use the questions asked and the responses generated through a Delphi to generate exemplars of future events that occur outside the realm of control of the planner, but must, nevertheless, be addressed in long-term planning.

I would argue that we try to reduce the magnitude of the unknown future by filling the void with our plans. Plans are made in pursuit of goals for some future moment. Both the moment of goal attainment and the present form the parameters of the time interval we consider in assessing plans. The Delphi technique presumes to help us structure events that may occur during that interval. Structuring a future is thought possible by examining events that might occur during the interval.

In a uniquely modern perspective, it is thought that most events are caused by human actions and reactions; men believe they control their environment. If we think of future events in terms of who might act to make them occur, we can think of them as goals. Goals are a type of future events in that they are not-yet-occurred states of affairs that, in order to occur, must be aggresively sought by someone or some group.

We assume that goals are a type of future event, and that for a goal to occur a strategy must be pursued. It is necessary to agree that simply allowing a condition to exist is also a strategy if we consciously recognize the outcome it might produce.

For example, to know that an event, *X*, may occur in the future and that the event may occur between now and the moment of occurrence of another event, *Y*, is not sufficient knowledge to judge the impact of event *X* on *Y*. To estimate an impact, we must know the strategies to *Y* that will be operating at the moment of *X*. We might say that the strategy followed in pursuit of *Y* forms a series of other, secondary, events/goals. The strategy to *Y* (events) can create our perceptual base for opinionated judgments about the specific events $(X-n)$ that are examined with a Delphi-like process.

Further, plans, goals, and strategies for a society affect subsets of that society in different ways. Those self-interested subsets might reasonably be perceived as experts on the plan, strategy, or goal. It is against the proposed actions of a society that societal events must be weighed. Men in the aggregate do not plan and pursue strategies toward goals; rather, individual men representing individual institutions do.

With knowledge of a goal, and the groups of society it affects, the Delphi may be used to create a chronolgically linked series of conjectured events which form a future environment. This is an outcome proposed by Delphi advocates. But in order to specify accurately a future environment, several changes in the present Delphi form are necessary. First, opinions of participants must be focused upon a previously proposed plan or goal whose strategy stretches across the time span reflected by the events in question before the exercise begins. Their anonymous opinions about events can then be set against personal value assessments about the plan, strategy, or goal itself.

Secondly, all persons are experts in their own opinions about the value of any goals. Different people have radically different opinions. Thus, a group cannot be seen as an aggregate from which one can directly extrapolate a consensus about events relevant to those goals. To disaggregate the several subgroups, the inter-quartile ranges of the various expert/interest groups are displayed Delphicly to allow planners to assess those subgroups' perceptions.

Third, the events examined in the Delphi must be displayed along a time line spanning the period between the present and the moment a goal is planned to be attained. We call this time line a future environment. For this chronology to be sufficiently believable to planners, it must be plausible and internally consistent.

A future environment is an agreed-upon construct of a period of time that has not yet occurred—a period that begins in the present and moves to a date beyond the moment of goal achievement. The future environment contains a series of moments in time against which we locate conjectured events. A series of events that is neither implausible nor inconsistent may be considered a set of givens that planners temporarily agree will act as exemplars of the types of events they may confront while pursuing their strategies. Against these events, they assess their strategies and goals.

If each affected subgroup of society is represented by a different interquartile range during successive questionnaires, and if their opinions about the locus of power sufficient to cause the event's occurrence are requested, those events which are perceived by all sub-groups as occurring approximately simultaneously, with the same power base, form key pieces of the chronology. Events that conflict with these are temporarily discarded. Remaining events (those which the Delphi respondents did not agree on) are located on the chronology, according to the planner's assessment of the power base for each event. The probability of an event is increased or decreased depending upon the value ascribed to it by the group who is seen as having the power to make it happen. To this chronology may be added events that fill out the future environment to create plausible links to the present.

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When future events are arranged in series, they become an intellectual playground, an environment which planners agree to consider exemplars of a future that will affect their assessment of plans, strategies, and goals. A future environment exists at the whim of planners, reflecting the perceptions and opinions of various groups which may be affected by the planners' actions. A future environment has several advantages: It covers the input of relevant populations affected by a plan, is predicated on human desires, and accounts for self-interested perceptions of the future. It plausibly links a future moment—the moment when the goal may occur—to the present. It confronts the goal and its strategy with a series of impinging events that the planners agree are probable and internally consistent with their knowledge.

In effect, planners now can agree to suspend their disbelief. The questions Delphi helps long-term planners raise form a plausible framework against which to plot alternative proposed actions.

This incremental specification of plans forward over time (against the future environment planners agree to allow to affect their plans) helps carry them into future time with a clearer perception of intervening time. A first stage assessment of their goals thus occurs against specific events in time and not against a broadly obscure concept, the future.

An institutional planning group has built a future environment like the one above. Against this chronology, the individual planners specify strategies toward their goals. They commonly accept a series of external events that may or may not affect their desired success.

For them to contemplate a future moment when their goal will have been reached, they are compelled to examine various intervening events that may exert sufficient force to alter their planned future activities. By suspending their disbelief they assume the reality of the events and develop a series of "future memories." They must examine causal links that may appear only upon reflection. Based on "memories" of the future, each writes his own "future history."

From these individual histories, alternative futures emerge that specify each individual's perception of the reciprocal impact of events throughout the timespan they consider. Scenarios of select moments can then be created to specify alternative views of the future.

EXPOSITORY METHODS: FUTURE HISTORIES AND SCENARIOS

Future histories

The writing of future histories is expository and reflective. The process is similar to the historiography of personally experienced periods. A future history clarifies for the writer his feelings, both reflective and intuitive, about causality. It gives him a chance to order and assess his assumptions about the future.

Because men write histories, different histories will be written about a common theme, set against common contingencies. At any moment, the impact of identical events on each man's goals and plans will be particular, unique, and profoundly important to him in his assessment.

Writing a future history allows individuals who are responsible for planning social change to recognize more clearly their roles as members of a society, not elite beings in some unaffected world. Future histories encourage individual planners to view the long-term future as a series of moments that are linked sufficiently and not necessarily.

Time is dynamic. Moments are linked by a causal chain of events. The relationships we see when we ruminate on past-time are of a different quality than those we find when we conjecture forward to a goal. When we trust our evidence of the past in order to extrapolate causation into the future, we assume that the causal links are necessary links—necessary conditions. We cannot assess causes in terms of alternatives unless we see them as only sufficient conditions when we try to anticipate the future.

If we examine the future chiefly in order to assess alternative strategies, we must deal with them as sufficient strategies that are amenable to change. Reflections on past causal links as necessary conditions in any future history are a logical fallacy, restricting our freedom to pose alternative sufficient conditions for both the future and the strategies that we pursue toward goals. If we concern ourselves with the interaction of events through time as merely sufficient, each individual may reveal alternatives not posed by others, while assessing his own incremental plans. We impose the past on the future when we extrapolate the past. A necessary past causes a necessary future.

While assessing plans forward through time is cognitive/intuitive, historical assessment is reflective. Each assessment starts from a different knowledge base. In the assessment of a strategy forward through time, we tap memories of our past and all those future memories of the strategic interactions we generate during the planning exercise. When one writes a future history from his role in the future as he conjectures it, his assessment of the time spanned draws on his total memories; he draws on his memories of the past which now include his memories of the future.

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In the writing of future histories, certain restrictions cover the planner's response:

—He must deal with the timespan examined in the past tense.
—He must posit his plans, and goals pursued, as states of affairs that have occurred.
—He must date specific occurrences so that he knows where, in time and space, the event occurred in reference to all other events.
—He must posit a future present role for himself to explain to himself why he is writing these memoirs.

Examples:

—I am retiring.
—My successor requests an overview of the institution's work.
—I am transferring and am fascinated by the developments I have seen during the past 20 years.
—I am describing to my children or to someone else why today is necessarily the way it is.

To develop a plausible series of casual events, planners must suspend their disbelief. They must treat the future they have built as an occurred reality, then reflect back to the present to speculate how it came to be. The strategies, the beneficiaries, the goals, and the decisions that have created it must be explicated to their satisfaction. Their satisfaction is defined as a continuing state of suspended disbelief.

Scenarios

In the futures literature a scenario is generally treated as synonymous with a future history. In the logic of the methods developed in this essay, it is appropriate to separate them. This alows them to be used for a crisper analysis of a future conjectured world in order to assess goals. The purpose of constructing scenarios is to examine discrete moments in time.

By disaggregating the two ideas, future histories are constructed by several individuals, as histories usually are: scenarios are written from the sum of future histories.

It is useful to treat a scenario as a plausible picture of a single moment drawn from all histories of a period. We do not experience history as a span of time; rather, we are confronted with separate moments, usually experienced as chunks-of-now. We write scenarios to create the perspective from which to examine how men responded to events at certain moments. If we use future histories to specify casual links over a continuum of time, the scenario becomes a tool to examine specific pressure points or strategic points of decision at precise moments in that continuum.

When one writes from his own role, his base of experience is self-centered. The planners who enter the exercise of writing future histories designate differing casual links for events; for other events, they may specify the same causes. These common perceptions may locate those moments which demand more clarification in the choice of alternative goal-bent actions. A commonly perceived interaction may be based on a perception of necessary causality. Such common causal events need examination to determine whether the coincidence demonstrates high plausibility in the conjecture, or whether the causal links have been seen as necessary. Hence common perception of impact, like any consensus of opinion about the future, must be suspect: Is the perception based on the group's belief in necessary causality? The various perceptions of individuals as to links over time underlie alternative assessments.

A scenario, then, is historically free. It records only what it must have been like for subgroups of the society at some moment, given certain interactions. This what it must have been like requires a basic pool of several histories, written so that the perceptions of several men can be integrated in a scenario. By thus disaggregating future histories, commonalities and disparities can be identified. The disparities demand that alternative scenarios be devised. One belief about the future holds that it is unknowable, thus the writing of one scenario is inadequate. Several histories allow several alternative scenarios to be built. Advocacy of only one scenario implies a belief that the causal links are necessary, not merely sufficient.

In sum, when we build a future environment from a Focused Delphi [1] and accept its events temporarily as examplars of the types of events we may face in the actual future, we build a useful playground for planning. If a planning group suspends its disbelief and accepts the environment it builds, it can plot several proposed strategies incrementally, against the array of chonologically-linked events.

Having lived through this future in pursuit of their individual goals, the participants develop a past that includes their memories of that future. Their memories of the interaction of selected events allow them the confidence to reflect on their efforts and then to write their own future histories. All participants' preceptions span the same period and specify various impacts at various moments not seen by everyone. The existence of many alternative perceptions demands that several scenarios be built of those moments, in order to assess the strategies that will be sufficient to achieve a goal. The sufficient causal links that harm certain segments of society can be assessed in detail to find still other alternatives for the future.

An institutional planning group has written a set of scenarios about future moments when their planned goals will have been reached. To this point in the exercise, the goals pursued by all individuals have

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[1] Details of the Focus Adelphi described briefly earlier in this essay are available from the author.

been accepted at face value by participating planners: Accepted as legitimate, but only as cliches.

Their goals have now been refined. The planners believe they know what the goal entails well enough to seek support for its pursuit. At this point, other people must be willing to cooperate. The planners must be willing to let others scrutinize their goals and strategies. So they must translate the goal, showing its concrete social implications at attainment. To do this, the planners must outline their understanding of the goal's implications, as well as the implications of strategies used in reaching it. They must specify the criteria of success in attaining the goal, embedding them in scenarios about the moment of the goal's attainment. In a value shift assessment, the probable values of individuals in the world of the scenario, and the value changes that will occur if the goal is pursued may also be outlined.

VALUE SHIFT ASSESSMENT: A TOOL TO EXAMINE GOAL IMPACT

It has been argued that goals, if achieved, occur at a moment in time. Strategies are pursued toward goals through a continuum of time. The environment spans a period of time; events occurs at select moments. We argue that histories of possible interactions between events and strategies may be written about the time continuum, while scenarios may be built of select moments in time. Similarly, values are held at a moment in time, but shift over time.

When individual planners examine goals, they must examine the values on which goal selection was based (values are on ordered set of perferences sustained by a system of belief). Similarly, they must examine the possible plausible values held at the moment of the goal's attainment. Out of these polar examinations, a shift in values over a period should emerge.

The task now is to ask what attaining a goal means in terms of shifting values at the moment it occurs. A most profound reality of the last half of the 20th century is the inability of values to keep pace with change. When individuals adopt goals for the long-term future they pursue a value or try to sustain a value currently held, by trying to promote or reconfirm its future existence. We might think of goals set for the long-term future as attempts to attain or support some value. (Baier and Rescher.)

It is enough for our purposes to have planners examine their goals in terms of the values implied in the goals' attainment; and to assess their goals against conjectures about a possible shift in values by the time the goal has been attained.

The planners must ask four basic questions in order to examine their goals and the values they imply:

> What are some reflectors of the goal's attainment?
> What values are implied in the goal's attainment?
> What value shifts are implied in pursuing the goal?
> What values are probably held now?

The purpose of the exercise is *not* to know what the future might be, but rather to make all planners, each assessing a goal of his choice that he personally chose to work toward, examine the implications of pursuing what has to this point been a cliché goal statement.

An institutional planning group has now delimited an array of plausible events that the participating planners agree to call their *intellectual playground. The chronology of events has been allowed to effect their plans forward through time toward several goals. Each planner has written a future history from which several scenarios of moments have been drawn. The planner located his own goal within a scenario, and examined the reflectors of the goal's attainment, the values implied in attainment, and the values that must change over time.*

The shifts he believes must occur over time must now be laid against his strategy. His strategy is a set of behaviors (and their results) which he will pursue through time in working toward his goal. His strategy assessment is a Future History Analysis and Review.

FUTURE HISTORY ANALYSIS AND REVIEW: A TOOL TO EXAMINE STRATEGIES

Behavior may be thought of as a set of activities. The interactions of men's activities create events. When men's activities and the events they cause are in pursuit of a goal, we might call that set of interactions a strategy. Future History Analysis and Review (FHAR) examines the array of events and activities that may cause the achievement of a goal at a moment in the long-term future.

FHAR is an idea based on concepts originally developed by Warren Ziegler, acting director of the Educational Policy Research Center at Syracuse, in 1969. The idea originated in a tool developed for the Government called Program Evaluation and Review Technique (PERT). The descriptors are "events" and "activities." Events occur at moments and may be thought static, while activities span time and may be thought dynamic.

FHAR, like PERT, is a tool to help planners focus on the incremental behavior necessary to reach a goal. In each case the planner must specify the intervening events and activities that form casual links to the attainment of the goal. All similarity between the techniques ends there. The author has chosen to polarize the PERT process and technique againt the FHAR process in order to more clearly outline the question FHAR compels the planner to respond to. It is in the differences that the unique value of FHAR may be most evident.

PERT is a useful tool for plotting the necessary events and activities that carry a project from conception to completion. Designed by North American Aviation, under contract to the U.S. Government to build the Polaris missile, PERT organizes the activities of many diverse units of an enterprise to guarantee delivery of subparts at critical moments in the development of the final product. Each unit of the whole is thought of as an "event" when it is completed; "activities" represent the effort necessary to create the event. The PERT chart must be integrated into a larger unit. It helps the planner keep complex pieces of the strategy integrated.

PERT is very useful regarding projects where goal attainment reflects the end of an investment of energy. Examples of this are: a missile launched, a bomb built, a gas station open for business, or apartments completed. When a goal can be stated in operational terms, the PERT exercise focuses the planner's attention on all intervening events and activities necessary to attain the goal, starting in the present. A pathway to the future is treated as the set of experiences that must occur to have the goal occur.

PERT is an appropriate tool for planning a time and energy strategy toward attainment of a physical goal. PERT does not generate alternatives. Alternative routes to a goal are posited only in terms of shifting time and energy allocations among events in the outlined strategy. No alternative goals are considered.

FHAR also starts with a goal in the future. FHAR first specifies alternative sufficient condition events with no sufficient activities to link them back through time to the present. For each sufficient event posited, starting with the goal, two or more prior alternative sufficient events must be stated. The further into past time one FHAR's, the more events are arrayed in any moment in time. Events listed in the present moment must be existing events or ones that are operationally feasible in the present calendar year.

Activities that are sufficient to link the events are then specified incrementally, forward and through time, toward the goal. The tool's purpose is to force the individual planner, as strategist, to confront the myriad starting behaviors that might be sufficient alternatives from which to launch the pursuit of his goal: not to set strategy, but to assess choices among strategies, to confront the magnitude of one's options, and the impact of diverse actions on the planned future.

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In transferring a tool from physical to social sciences, one problem is that physical entities when constructed and completed no longer demand their former energy investment. Once a car is built, it is built: then it is warehoused, sold, driven. In the social sciences, the focus is on the driver and his ability, attitudes and techniques—rather than on the car itself. The goal is the presence of a continuing behavior we recognize as good driving. To that end, the aggressor must continually invest energy in order for the goal to remain in existence.

This different energy investment is critical to the choice of appropriate tools for examining goals. Physical goals, once reached, exist without the investment of maintenance behavior on the part of the goal advocate—that person who urges support for pursuit of the goal. Social goals demand one type of energy investment to attain the goal, and demand another to maintain it by encouraging an appropriate social behavior. If we cost social projects only to the moment when an exemplar can be identified and call that moment "goal attainment," we fail to reach the social goal by not planning investment to maintain the behavior which is genuinely part of our goal.

The FHAR process resembles a brainstorming exercise. In brainstorming, no judgments about ideas generated are made while ideas are being gathered. For any moment, as many sufficient events as possible are retailed, back through the examined period of time. These points in time are then linked by sufficient activities which could cause the event to occur.

By separating the two procedures, the creative exercise of event specification is not constrained by concerns about causality. The specification of events occurs before analysis; the events can be explicated as static entities. Further, the events are the self-imposed parameters of alternative possible occurrences which the planner judges he must account for. By not attending to causality at this first stage, a greater variety of events is elicited.

On the other hand, the activity links, while creative, are thoughtfully introduced and more reasoned. As many causal activity links as events appear, but the dynamic nature of activities differs from the static events they bring about.

As with any series of questions we ask ourselves, the output supplies the base for new questions. The FHAR chart is no different. Examining the chart, several points can be made to further break the set of necessary causality and to introduce equally important information.

We argued that goals can be thought of as "not yet occurred" events. At the moment of the goal's attainment, we can point to it as an event. In addition, all the intervening alternative events we posited between the present and that future moment, if integrated into our chosen strategy, become goals themselves. The activities link our behaviors in our forward pursuit to a goal through time.

All events in the present moment are recognized as occurred goals or the unintended consequences of goal pursuit. Many events listed in the present may harm the society in the present. Men do not pursue bad goals, rather, they are unaware of the goal's impact on the future when they pursue it. We may consider the events in the present calendar year as the goals (or consequences of goals) of men in some past moment. The sets of events listed in the present may then be seen as the goals and consequences of the pursuit of some past goal.

Noting this, planners now must operationalize the process they just experienced, only in reverse—this time examining the impact of their (strategy) on the future moment when it will cause a goal to exist. Working forward from a present event, alternative outcomes (events) are posited until the future moment of goal attainment is full of consequences attributable to the pursuit of one goal. An exercise of this type compels the planners to chose their strategy wisely and to consider the detrimental and beneficial impacts of choice.

This effort concerns only one goal and its unique strategy. Within one institution many goals are simultaneously pursued, each with a different moment of attainment. The events that are mile posts in a strategy, and the activities that reflect planned behaviors, are now clearer to each goal advocate. But now a goal is no longer merely a cliche; it reflects the planned values and behaviors of some group. Now, that goal can be set against other goals and assesed to help determine an institution's priorities.

An institutional planning group now understands the implications of following its goals into the long-term future. Now the group must examine all goals to determine priorities for the investment of their limited energies. Each member's goal statement is at best only understood as a cliche by all others. To rally support and justify pursuit of his goal, he must clarify to the institution all that the goal statement implies, and how the goal affects and is affected by the pursuit of all other goals.

The impact of goals may be examined with the cross-purpose matrix. Certain goals will work at cross purposes to each other; cross purposes themselves may be examined through the matrix.

CROSS-IMPACT MATRIX AND CROSS-PURPOSE MATRIX: TOOLS FOR PLANNING

Of all issues facing forecasters, the problem of the interdependency of events is most vexing. One can scarcely conjure an event for which no predecessor or influencer exists as a preceding event.

The cross-impact matrix program, designed at the Institute for the Future, attempts to deal with this problem. The process is rather simple. Events drawn from a Delphi are assessed against an arbitrary time horizon to assess their probability, plausibility, and impact upon each other.

However, a continuing problem not yet effectively handled is that of substantive judgments in regard to filling the matrix cells. Ample evidence shows that the quality of output from a cross-impact matrix is largely determined by the quality of analyses and judgments which fill the cells.

Both the cross-impact matrix and the cross-purpose matrix deal with future events. The cross-impact matrix deals with that subset of future events called future news events. The cross-purpose matrix deals with that subset of future events called goals.

The cross-purpose matrix was devised by the author to deal with goals pursued by advocates. A goal is an event that is intended to occur; that is, for every goal, there is an aggressor/advocate. The cross-purpose matrix does not attempt to replace the cross-impact matrix, but to deal with a subset of future events (goals) that cannot be assessed in the same way as future news events.

The cross-purpose matrix has several operational rules: original probability information in each of the matrix boxes can only be determined by the aggressor for the goal under consideration. The meaning of an event, its impact on all others, and the impact of occurrence of all other events on it depends on how the aggressor behaves in pursuit of his goal. This strategy is known only to him.

The second rule is that the subject of examination is the planned strategy. The examination of the goals themselves is inadequate. The very process of grouping under a single goal all possible ways one might behave in order to reach the goal tends to hide the way one will behave. In hiding the way one behaves, unintended consequences and strategies which negatively affect other goals are often ignored. What must be explicated and assessed are the activities and events that comprise a sufficient strategy to bring about the goal's attainment. These basic conditional rules underlie the cross-purpose matrix.

The cross-purpose matrix process opens by recognizing that goals are cliche statements to all but their advocates. Each goal has its own advocate, in the person of one planner in the exercise. Each individual knows what his goal implies to other subsets of society affected by its pursuit (focus Delphi); its impact over time on himself (future history); its location in the continuum of time (scenario); its value shift implications (value shift assessment); and the strategy he would pursue to reach it (future history analysis and review). Now he must explain its temporal link and value to his institution to insure their commitment to a policy that suits his end.

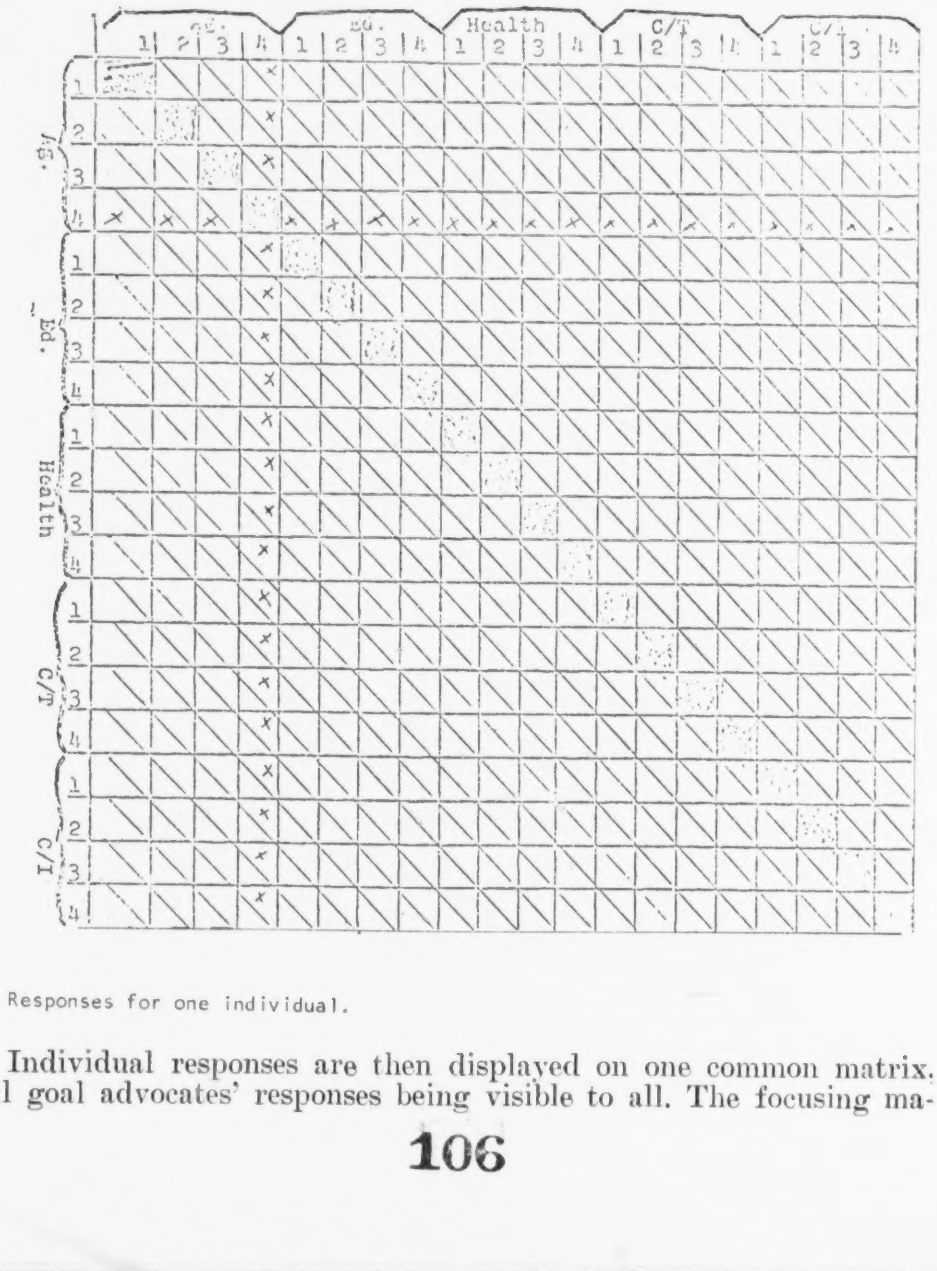
To prepare his goal for consideration the planner must answer several questions:

1. If the institution adopted my goal as a top priority, when is the earliest possible date it could occur, knowing the time necessary for each of the activities and events that comprise my proposed sufficient strategies to create it?
2. I know competing goals exist within the organization, all vying for limited energies. I know them only as cliches, but some are probably as worthy as mine. Knowing this, when is it most plausible to assume my goal will become an occurred event?

A matrix is constructed of all goal statements under examination listed both vertically and horizontally at the side and top of the matrix. Events are listed chronologically from top to bottom and left to right, based on the most plausible estimate of the occurrence date (question 2) set by the goal advocate.

Advocates for each goal complete the row and column appropriate to their goal. The process is as follows: When answering horizontally across the matrix (row), each responds asking himself for each goal this question: "I assume I am going to be 100 percent successful in attaining my goal. If so, what will the effect of my success be on the hoped-for success of each of the other goals as I understand them?" Responses are marked in the bottom half of each square of the cubes in the appropriate row in the matrix. The designation of impact is + +, +, 0, −, − −. The same goals are approached by each individual vertically (column) on the matrix, and responded to in the top half of each box; to respond they ask themselves this question: "I assume their goal is 100-percent successful. What will its success do to me and my hoped-for success?" They respond again with a + +, +, 0, −, − − scale. (See chart II, in which hypothetical goal No. 4 has the appropriate halves of each cell marked.)

CHART II

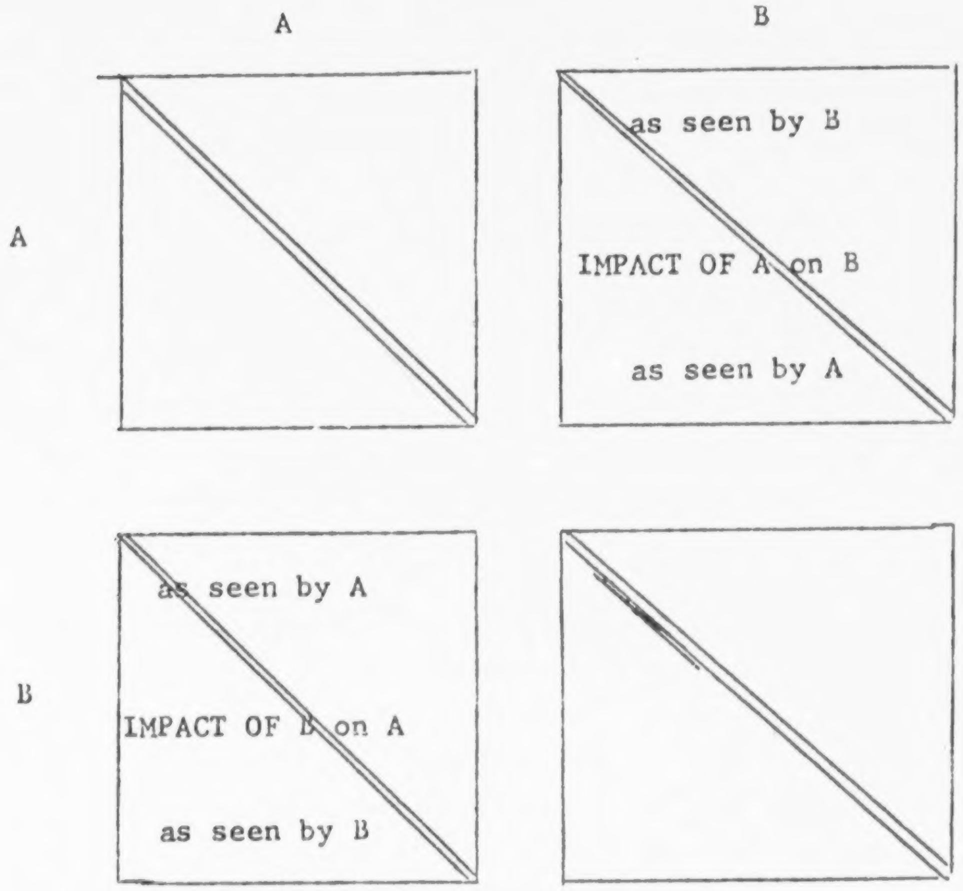


Responses for one individual.

Individual responses are then displayed on one common matrix, all goal advocates' responses being visible to all. The focusing material necessary for goal assessment through strategy specification is now displayed. The positive and negative impacts of the goals, as seen by the composite group of goal advocates, is visible. This array shows all individuals the existing perceptions of each other's planned goals and how they will affect their own pursuits. This exercise compels planners not to consider their goal as given.

In any cubicle of the matrix, a spread of opinion is displayed. (See chart III.) The bottom half of any box along the horizontal (row)

CHART III


A
B
A
as seen by B
IMPACT OF A on B
as seen by A
B
as seen by A
IMPACT OF B on A
as seen by B

CROSS - PURPOSE MATRIX.KEY

++ = strong positive impact

+ = positive impact

0 = neutral or no impact

- = negative impact

-- = strong negative impact

shows the goal advocate's views of the impact of his program's success on the success of the goal listed in the vertical. The top half of the box shows the same information, but from the perceptions of the goal advocate of the vertical (column) listed goal. That is, assume a horizontally listed goal, *a*, and a vertically listed goal, *b*. Their advocates are indicated by *A* and *B*, respectively, in the bottom half of the box, *A* indicates his view of the effect upon *b* of the total success of *a*; in the top half, *B* answers the effect upon *b* of the total success of *a*—both ask the same question, but the answers come from two different perspectives. Each box, of course, has its alternate, where the reverse question (the effect upon *a* of the total success of *b*) is asked by each participant. All this acts merely as a stage setter, though the information spread can be analyzed. This part, however, is best used only to move the planning group forward, to a more important stage of the exercise.

The process now forces out the sufficient reasons for the spread of opinion in any given box. Individuals or groups do this by finding each other and explaining their differing perceptions to each other; that is, "What does this cliche mean?" "How do you propose to pursue your goal?" The process continues until each cubicle of the matrix displays only one bit of information. That bit of information is the agreed-to perceptions of both goal aggressors as to the probable impact (− or +) of one goal on the other.

We might now add to this matrix of goals the news events that comprise our future environment over time. The participant is asked to respond not only about his goal against the occurrence of all other goals, but to his goal if the specified news event should positively occur:

> If my program is successful, what is its impact on the original forecast of the occurrence of the news event?
>
> If the news event occurs, what does it do to the anticipated success of my goal?

At this stage it is appropriate to ask questions of the display; that is, the matrix output. Responses of all participant advocates give an array of perceptions of the impact of pursuing any of a set of goals by an institution, on all other goals of that institution.

First, in any cubicle of the prenegotiation matrix (where a spread of opinion may still exist) some cubicles may have a common impact sign (+/+). However, that does not evince common perception of impact. The exposition of the goal itself must be examined:

> Perceptions of participants may have been based on the goal as a cliche rather than on the advocate's rationale.
>
> The goal may have been too abstract to accurately reflect changed behaviors foreseen by its advocate.
>
> The idea may have been too novel to be understood without its advocate's rationale, the value shifts it pursues.
>
> The goal may have been agreed to but the corresponding strategy may be debated.

The dynamics of the negotiation can be examined:

> What is the nature of the negotiations? That is, "Who moves?" "Who seeks whom?"
>
> What is the direction of agreement when they finally arrive at an impact? Is it toward the affected or the affector?

Any institution contains sectors of interest and of different subject concerns. One can examine all the goals in a single sector of interest against the others. This helps specify, within any individual sector of interest, a top priority program within that sector—one with high positive impact on all others in that sector. One might also examine the programs of one sector against the programs of one other sector, examining whether the sectors interact or if any programs within them affect each other.

One can examine the negative power cells and the positive power cells. That is, those with a — or + +, both before and after negotiation. What is the nature of the high impact perceived by both parties? One might also analyze the spread, which may be quantified on an absolute scale. The spread between + + and — in any box is an absolute misunderstanding of 4; that is, there is a spread of five digits between those two. The difference between + and 0 is an absolute spread of 1. Absolute spreads can be quantified to examine the magnitude of misunderstanding between certain sectors. That is, does the terminology and value of a sector tend to be regularly misunderstood by another sector?

Next, one might examine the general range of impact of each goal:

What are the goals that consistently have no perceived impact on any others?

Which programs are low impact or high impact programs?

One can now examine the stable and unstable programs, e.g.:

Which programs tend to be stable, that is, unaffected by those external news events mentioned above?

Which programs tend to be unaffected over-all by the occurrence of many news events or the occurrence of all other programs?

Those that are apparently unaffected by events we might call stable goals. An unstable program would be very sensitive to the occurrence of other events as perceived by the participants.

We might examine at what moment a goal is unstable and at what moment in time it becomes stable. For example, a new government agency languishes in an unstable state where nearly any news event affects it until it receives its funding. From that moment until the next funding request, it is largely a stable agency. It would be perceived as such and would be visible in the matrix as such. This kind of analysis allows the executive to calendar those things he feels are fragile at various moments, rather than to worry about everything all the time. Another examination one might make is to focus concern on specific programs within the matrix which show consistent value for all other programs, positive or negative, at the moment when they are planned to occur.

These comments, then, explore some possible uses of the cross-purpose matrix as an interaction device for long-range planning. The cross-purpose matrix represents a confrontation focusing device, compelling planners to array their strategies before competing advocates and to defend them. The strategies reflect planned behaviors over time. The interactions of these behaviors with the outside world build a material base for the set of events that occur and affect all lives in a society. The exercises described above present a logical set of questions that long-term planners might reasonably confront in preparing to alter the future.

The future environments we will actually encounter will include the results of the actions of present men, pursuing what they believe to be worthwhile goals. Men can thus usefully examine future plans in a future environment (one that is comprised of a set of events they agree are plausible). Men believe in what they do. In the planning stage they must seize the opportunity to suspend their disbelief and to examine their ideas in dispassionate terms of sufficiency.

THE STUDY OF THE SUFFICIENT FUTURE: THE LOGIC OF SUSPENDED DISBELIEF

Throughout this essay the underlying assumption has been that we must see the future as an array of sufficient causal relationships. To study and examine a future, an individual must consider his examination as merely sufficient. To do this, he must suspend his disbelief in order to believe his incremental manipulations of events in time. At the end of a long, internally consistent examination of several sufficient future developments, priorities for a given moment can be specified. When priorities are thus specified and goals pursued, the future sufficiently becomes linked to the present. The suspension of disbelief is the sole condition that allows men to examine their sufficient plans before these plans become necessary and are imposed on an unprepared world.

When futurists sell policymakers techniques that induce consensus, or conformity to an opinion, each individual's ability to suspend his disbelief is threatened. Those who disagree with the consensus find the foundation of all their responses about the future weak and undermined. Consensus attempts to induce closure. Too early closure prevents suspended disbelief and compels us to operate as if what we do were necessary rather than merely sufficient, inevitable rather than a matter of choice.

Only sustained divergence allows a more thorough examination of plans to exist, yet divergence becomes more difficult to sustain as our play at future grows formalized. Convergence and consensus methods reach closure but eliminate alternative options; more open methods must be adopted. The real future will be necessary. We do it violence to base our speculations on an insufficient examination of sufficient futures.

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N.B. The ideas developed here emerge from discussions and readings with the persons whose works are listed below. Originally a much longer and complex version of this document was reproduced and distributed to a limited audience by the Educational Policy Research Center at Syracuse, a division of Syracuse University Research Corporation, primarily funded by the United States Office of Education. I would like to thank Miss Judy Dollenmeyer and Mr. Donnelly J. Barclay for the first time they spent editing this paper into its present form.

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FACTORS AFFECTING THE FUTURE DEMAND FOR EDUCATION*

By KENNETH E. BOULDING

Economic factors are those which concern the way in which society is organized by exchange and by the transfer of "exchangeables" or commodities. There are a number of commodities, however, which may be called "peculiar" because they are produced, bought, sold, and consumed in a very complex sociological matrix. Labor is one such peculiar commodity and a good deal of rhetoric has been devoted by the labor movement to demonstrate that labor is not a commodity. Nevertheless it is bought and sold and it has a price. Thus it has all the properties of a commodity. But it has other properties besides, which make it peculiar.

Education similarly is a peculiar commodity. It is bought and sold and has something like a price. There is a segment of the economy which can be thought of as the educational industry. In the United States, for instance, Machlup estimated that as of about 1958 the total knowledge industry occupied almost thirty percent of the economy.[1] What we think of as the educational industry, that is schools, colleges, universities, and organizations for formal education, public and private, occupies approximately 7 percent of the gross national product and this proportion is rising very steadily. Formal education is now an "industry" which occupies a larger proportion of total economic activity in the United States than agriculture.

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*In: *Economic Factors Affecting the Financing of Education*, Roe L. Johns, et al. (eds.), Gainsville, Florida: National Educational Finance Project, Vol. II, 1970, 1-27.

CONCEPTS OF SUPPLY AND DEMAND APPLIED TO EDUCATION

If education is a commodity and schools are an industry, it should be useful for us to ask ourselves how far the economist's concepts of demand and supply can be applied to it, and how far changes in both the price and quantity of education can be interpreted in terms of movements of demand and supply.

Relationship of Price and Quantity to Demand

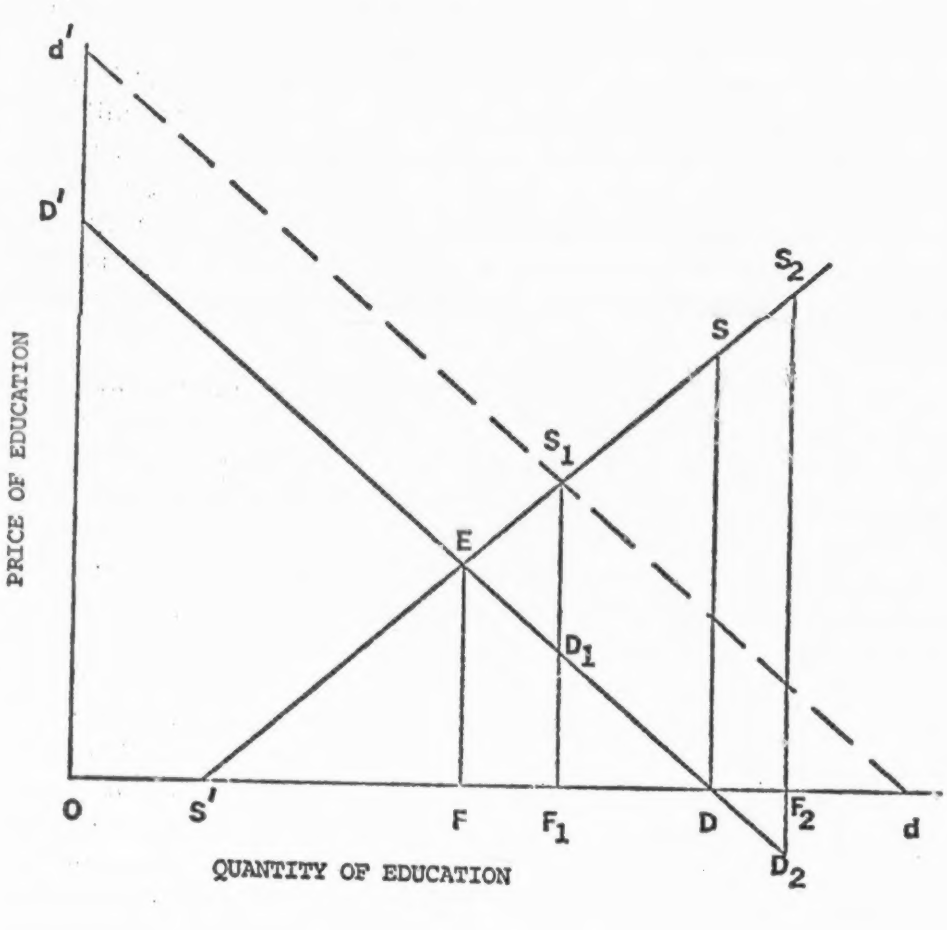
What the economist means by demand is a functional relationship between the price of a commodity and the quantity which will be purchased. Similarly, supply is a functional relationship between the price and the quantity which will be offered for sale. This is illustrated in Figure 1-1. Here we plot the quantity of education horizontally and the price of education vertically. We postulate a supply curve S'S. This has been drawn with a positive slope indicating that in order to have an increase in quantity of education, we have to pay a higher price for it. The demand curve D'D is drawn with a negative slope indicating that the lower the price of education the more of it will be purchased. If education were left entirely to the market there would be an equilibrium at E, with a quantity of education OF both supplied and demanded at a price FE. We do not have to assume of course that the functions are linear; they are merely drawn as straight lines in the diagram for convenience.

Relationship of Subsidies to Quantity of Education

Suppose now that the society decides that the quantity of education which would be forthcoming under a completely free market is not sufficient. There may be all sorts of reasons for this decision which we will look at later. Suppose that it is decided that the ideal quantity of education is OF_1; then in order to persuade people to purchase this amount the price would have to be F_1D_1. But in order to persuade people to supply this amount the price to the supplier would have to be F_1S_1. The difference, D_1S_1, is a subsidy per unit of education which would have to be given in order to achieve that expansion of the quantity of education from OF to OF_1. If we wanted to expand the quantity of education to OD the price would have to be zero and the subsidy equal to DS. That is the point at

Fig. 1-1

PRICE AND QUANTITY OF EDUCATION



which education becomes completely free to the purchaser. If we wanted still more education than this, say OF_2, we would have to subsidize the purchaser with a negative price of F_2D_2 and subsidize the supplier by an amount equal to F_2S_2 per unit.

Elasticity of Supply and Demand

The discussion above is a textbook analysis. It does, however, point to one important characteristic of the system, that is, the importance of the elasticity of the supply and demand curves. The absolute elasticity is the slope of the curves, or the ratio of the change in quantity to the change in price. If supply or demand is inelastic, this means that a change in price produces only a small change in quantity, and the curves in Figure 1 will be steep. It is clear that the amount of subsidy which is required to achieve any given expansion of quantity depends mainly on the elasticities of supply and demand. If the supply and demand are inelastic so that it takes large changes in price to produce a given change in the quantity, then the subsidies also have to be large. If the supply and demand are elastic the subsidies required will be small. If the functions are linear then the elasticity of subsidy, that is, how much subsidy per unit must be given to produce a unit of expansion of quantity, is equal to the arithmetic sum of the elasticities of demand and supply.

Another useful product of demand and supply analysis is that it separates the concept of demand sharply from the concept of "need." If the demand is a functional relationship between price and quantity purchased it is affected not only by desire and income but also by alternative uses of income. The main reason why demand curves generally have a negative slope is that a high price for one commodity makes the use of income for expenditure on other things look more attractive. The concept of need, on the other hand, is a concept of administrative allocation rather than of market or price allocation. It tends to be thought of in absolute terms without regard to price or alternative opportunities. We could perhaps define need, although this definition might be questioned, as the quantity demanded at a zero price, this representing, as it were, the maximum amount demanded in the absence of consideration of other opportunities and alternatives. This definition however is possibly unacceptable because of the linguistic paradox that we always demand less than we need!

Another useful conclusion of demand and supply analysis is that the effect of an increase in demand depends on the elasticity of supply if the supply function does not change. The effect of an increase in supply similarly depends on elasticity of demand if demand does not change. An increase in demand may mean that the quantity purchased will be larger at each price. That is, it represents a shift to the right in the demand curve. Thus, a rise in the demand for education would be represented by a shift of the demand curve from, say, D'D to d'd, with the equilibrium position moving from E to S_1, with a higher price F_1S_1, and also a higher quantity OF_1. The steeper (more inelastic) the supply curve, the greater will be the rise in the price and the smaller the rise in the quantity for any given change in the demand. As we have been facing a sharp rise in the demand for education in the United States, and indeed in the whole world, the question of the elasticity of supply of education is by no means irrelevant.

Quantity of Education and Price

Supply and demand analysis does give us some qualitative insights into the possible dynamics of any industry or segment of the economy and does enable us to ask some questions which perhaps we may not otherwise have considered. Education however, as a segment of the economy exhibits so many peculiarities that an interpretation of the demand and supply analysis is by no means easy and its results must be interpreted with great care. The first problem is that of the measurement both of the quantity of the education and of its price. These two problems are very closely related, because the price, P, multiplied by the quantity, Q, of any commodity is equal to the total revenue, E, derived from its sale, that is, $E = PQ$. It is fairly easy to get a dollar figure for the total amount E that is spent on education. What is not so easy is to divide this into a price component and a quantity component. Does the rise in the proportion of the economy which is going to education, for instance, represent an increasing quantity of education or merely an increase in its price relative to other things? We can deflate the total dollar revenue of the education industry by some price index to take care of inflation. Even after we have done that, however, the question then arises how much of the real increase is due to price and how much is due to quantity? These are not two questions but one, for if we can define the quantity we will also be able to define the price, which is simply the ratio of the total revenue to the quantity: $P = \frac{E}{Q}$.

Any attempt to measure the quantity of education produced forces us back almost embarrassingly on the question of what is the product of the educational industry? Ideally the answer to this question is that education produces a product known as knowledge, which is some kind of restructuring within the human nervous system to produce revised images of the world which are better "maps" of the real world itself. It is odd that we have no word in English to describe "false knowledge," that is a map of reality within the human nervous system which does not correspond to the world outside. Nevertheless it is clearly the business of education to produce true knowledge rather than false knowledge, though we now run into an old philosophical dilemma about how we know that our own or anybody else's knowledge is true. One answer to this question is that we can neither perceive nor measure the truth, or the complexity, of the knowledge structure directly, but that we can detect an *error*, either in our own or in somebody else's knowledge structure. We do this by observing a very specific form of behavior, that is, making predictions by stating an image of the future, and then testing these predictions by observing the future when it becomes the present. Predictions which are falsified produce a "mismatch signal" which, if a rather complicated set of conditions are fulfilled, will correct the knowledge structure, and so move it in the direction of a more accurate map of reality.

The product of education, furthermore, is not merely true knowledge but valuable true knowledge, valuable, that is, to the knower and to the society in which he is embedded. True knowledge about how to find a post office is more valuable to most people than true knowledge about the configuration of the back side of the moon, though to an astronaut who is about to land on the back side of the moon true knowledge about its configuration may be very valuable indeed. In order to measure the quantity of education, therefore, we would have to know not only the amount of true knowledge which has been produced by it in human nervous systems, but we would also have to multiply each item of true knowledge by "shadow price" or evaluation coefficient in order to calculate the aggregate significance of new knowledge.

Part of the difficulty of viewing education as an industry is that to the learner, a very large part of the value of new knowledge, acquired in formal education and in the classroom, arises from its usefulness in passing examinations. Thus the very device which is used to test the value of new knowledge also creates that value. This is a little bit like the problem we face with some commodities, where the evaluation of the commodity itself is a function of its high price. Diamonds are valuable because they are valuable and for no other very good reason. One recalls the old story of the grocer who divides a virtually homogeneous box of tea into three parts, one of which he sells at a low price to the poor, another at a moderate price to the middle class, and another at a high price to the rich, everybody being satisfied that the price he has paid reflects the quality of the tea. One suspects that education is rather similar and that the high reputations and high incomes which are derived from better quality institutions are a function not of the knowledge acquired in these institutions but of the reputation acquired in them.

Here we start out with an innocent question of defining the quantity of education, and we seem to be hovering on a huge morass known as human learning theory. Nevertheless, there is no escape from this. The product of education is the process of learning: that is, the growth of knowledge, and, more than that, the growth of valuable knowledge, the measurement of which presents great difficulties, particularly in the absence of any very good theory of how human beings learn anything at all. It is not surprising, therefore, that the education industry has turned to surrogate measures of the quality of education which, it is hoped, at least bear a moderately linear relationship to the thing we are really trying to measure. An obvious surrogate measure of this kind is time spent in being educated, such as hours of classroom attendance or years of schooling. Knowledge gained, it is hoped, is linearly related to the application of the seat of the pants to the seat of the classroom chair. The defects of this measure are all too easy to state. What many children learn in the classroom is knowledge which, no matter what its truth, has a highly negative value, that is, that they are no good, that they always make mistakes, that they cannot speak good English or do algebra and that they are condemned to the lower class for life. Other children, by contrast, especially those in the more prestigious schools, learn that they are somebody, that they can succeed in almost anything that they really want to apply themselves to, and that if they fail it is because they have chosen to fail rather than because they are failures. Knowledge about personal identity, to which, of course, the whole knowledge industry contributes, is peculiarly significant in formal education. It has a high value either positive or negative for the student and it very rarely gets in any direct way into examination results, accrediting decisions, or even into planned program budgeting systems.

As long as there is any positive correlation, however, between the measure that we are using and the thing that we are trying to measure, I suppose we can say that a bad measure is better than no measure at all. Thus the quantity of education as measured by time spent may be for most students, though not for all, better than nothing. It is the nagging feeling we have that, for some students, classroom hours are negatively correlated with the value of the knowledge acquired that makes us uneasy, but we can hope that these cases are a small minority.

Education and Feedback from Consumer

A further problem of the demand for education, which arises also because of the extreme difficulty of measuring its quantity, is that the demand is made for the most part on behalf of others. All demands are subjective. If I have a demand for tea, it is simply because the consumption of tea gives me some sort of subjective satisfaction, but at least it is my satisfaction. If I buy a tea the flavor of which I do not like, I very soon find this out; there is very rapid feedback in the system and I do not buy that particular kind of tea again. In the case of ordinary commodities, therefore, the market provides a reasonably adequate process for learning about exchange opportunities by the making and testing of predictions, and it provides quite rapid feedback from "purchase error," especially in the case of commodities with a short length of life. The longer the length of life of the commodity, the harder it is to detect purchase error and the less satisfactory the feedback from experience. Though it is easy to learn that one does not buy some particular brand of tea, it is much harder to learn that a particular kind of automobile is a lemon. When purchases are made on behalf of others, the error detecting process of mismatch and feedback is still further eroded. Wedding presents are a notorious case in point where the experience of the recipient is rarely fed back to the giver.

Education is a commodity which suffers from almost every conceivable handicap when it comes to the correction of error and the evaluation of results. Its product has a very long life. All the wrong things we learned in school usually stay with us the rest of our lives. The product of formal education has a life expectancy of some sixty years. Almost the only other commodity with this length of life is housing. It is perhaps no accident that the housing industry, like the educational industry, is notoriously unprogressive, is subject to rather meaningless changes of fashion, and produces an output which seems remarkably difficult to improve. But even houses are frequently bought by the people who live in them, though it is rather rare for them to produce any feedback to the architect about his mistakes. Education, however, is mainly purchased for children and students either by their parents, the church, or the state or some other agency which is acting on their behalf. Under these circumstances the feedback, especially unfavorable evaluations from the student, is regarded as a mark of ingratitude, is discouraged, and very rarely results in much of a learning process on the part of those who pay for the education. Here then is the ultimate paradox that the knowledge industry is precisely the one in which it is hardest to learn anything about success or failure.

Measuring the Educational Product

It is not surprising that under these circumstances the educational industry is remarkably subject to fads and fashions. It is extremely hard to measure the product where the act of measurement of the product distorts it, and the product is enjoyed (or not) by people who do not pay for it. It is not surprising that the practitioners of the industry spend a great deal of time in developing "objectives." Education indeed is almost the only industry in which the measure of success is the achievement of an imaginary product. Schools of education spend a great deal of time inculcating school teachers with the necessity for stating objectives and then measuring their achievement by achieving them. Under the impact of behaviorism, of course, we abandon the notion that anything could be known about knowledge, hence we now go in for "behavioral objectives" on a theory, derived mainly from rat psychology, that learning can only be measured by change in behavior. As long as we include linguistic behavior, treating students as if they were rats is not so dangerous. I am not arguing that the thinking about behavioral objectives is worthless. It can easily, however, become ritual, and there is bound to be a strong tendency for teachers to define as objectives the changes in behavior in the student which they think they can achieve. Here is a wonderful example of the self-fulfilling prophecy in which mismatch signals are utilized to change the information input rather than to change the image of the world.

The Grants Economy and the Exchange Economy

The unfortunate but unavoidable fact that those who pay for education are not usually the ones who receive it, except in the somewhat quantitively minor case of adult education, is reflected also in the fact that the educational industry derives its revenue to a very large extent from the "grants economy." The total economic system can conveniently be divided into two parts. One is the exchange economy which is organized by two-way transfers, in which A gives B something and B gives A something. The other is the grants economy which is organized by one-way transfers, in which A gives B something which is exchangeable but B does not give A anything that is exchangeable, even though he may give A certain psychological satisfactions that are not strictly, however, part of the economy.

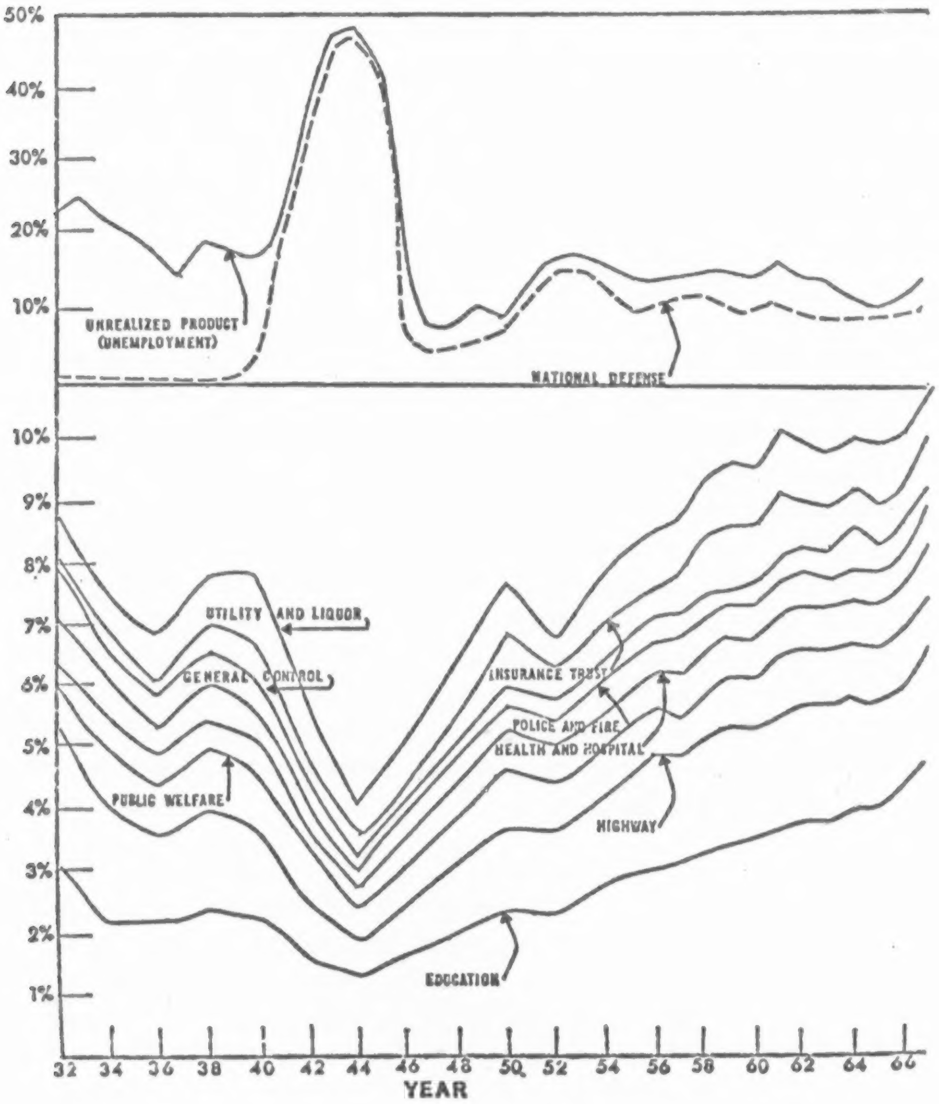
Grants are motivated by two principle motivators — benevolence and fear. If A gives a grant and receives nothing tangible in return, this may be, in the first place because A feels benevolent towards B. Benevolence means in technical economic language that the perception of utilities is interdependent; that is, if A perceives that B's welfare is increased, A's welfare is increased by this perception. Benevolence, of course, can be negative, in which case it becomes malevolence. Selfishness or indifference is simply the zero point on the scale of malevolence and benevolence, in which A's perception of a change in B's welfare makes no change in A's evaluation of his own welfare. This, in fact, is rather a rare case. Most relationships have at least a small amount of malevolence or benevolence. A's benevolence towards B may be measured by his *rate of benevolence,* that is, the amount A will sacrifice in order to perceive that B is better off by a dollar. If A's rate of benevolence is anything above .5, and if A by giving B a dollar perceives B to be better off by two dollars, then it is quite rational for A to make a grant of one dollar to B.

There is, we must recognize, a second source of grants. If B threatens A, A may make him a grant in order to prevent him from carrying out the threat. This is *tribute*. It is not always easy to tell in practice where benevolence ends and tribute begins. Grants given for education, whether by parents of the children, which are in the private grants economy, or by the state indirectly to children and students through the state supported schools, in the public grants economy, are mainly the result of benevolence, although the threat of having children around the house all day may not be wholly insignificant in persuading parents to vote for school taxes. The fact that the revenue of the education industry arises mainly in the grants economy introduces some peculiarities which are not found in commodities sold in the exchange economy. The elasticity of demand for a commodity in the exchange economy depends mainly on its substitutability with alternative sources of obtaining similar satisfactions. A rise in the price of a commodity in the exchange economy will usually diminish its purchase mainly because other uses of income for purchase look more attractive. The extent to which the purchase declines depends on whether attractive substitutes can easily be found, assuming the prices of other things to be uncnanged. In the grants economy a grant for one purpose competes much more with grants for other purposes than it does for commodities in general. Grants are a part of the total flow of expenditures which in some ways forms an "economy" of its own insofar as the total of grants is the result of the general level of the sense of community or benevolence, so that an increase in a grant for one purpose is likely to lead to a diminution in another grant rather than in the diminution of a purchase in exchange. Thus, the total sum of grants is likely to be more stable than any particular component of it. *The demand for education therefore is likely to depend more on what is happening in other parts of the grants economy,* for instance to other government expenditures, than it is on what is happening to income and expenditures in general.

We do not really know how far this is true in the case of the family. Does the family, for instance, regard the education of its children in private schools as competitive with a new car and other items of conspicuous consumption or does it regard payments for education as competitive with donations to charity or with taxes? A study of family budget response to the surtax of 1968 would be extremely instructive in this regard, yet as far as I know this has not been done. There is a good deal of evidence that expenditure on education is highly vulnerable to major changes in national defense. It is also vulnerable to severe depression. This is shown in Figure 1-2. Here we take the Gross Capacity Product as a measure of the total size of the economy, the Gross Capacity Product being roughly what the gross national product would have been had there not been

Fig. 1-2

COMPONENTS OF STATE AND LOCAL GOVERNMENT EXPENDITURE
AND
NATIONAL DEFENSE AS A PERCENTAGE OF GROSS CAPACITY PRODUCT



any unemployment. The bottom part of the diagram then shows the various components of state and local expenditure as a percentage of the Gross Capacity Product. The upper part of the diagram shows the proportion of the economy devoted to national defense on the one hand and to what is called unrealized product on the other. Unrealized product is actually equivalent to the proportion of the labor force unemployed, as we have calculated the Gross Capacity Product. The impact made on both local government in general and education in particular by both the depression and the Second World War is very striking. Equally striking, however, is the resilience of education in the face of a large and permanent increase in the proportion of the economy devoted to national defense.

Changes in the Productivity of the Educational Industry

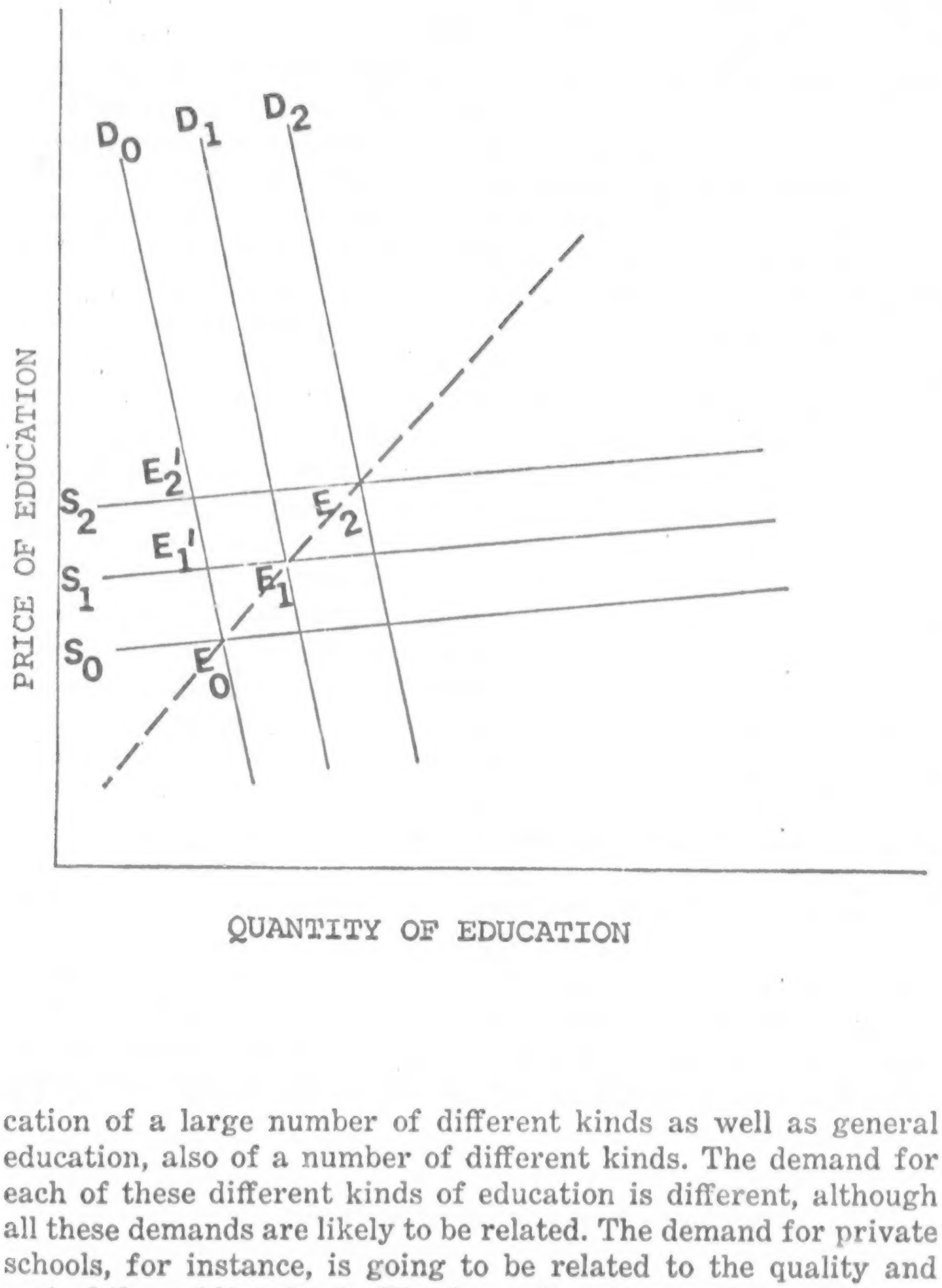
One final point which is relevant to the consideration of the demand and supply of education is that education is still very largely a "craft" industry, the methods of which have not been much touched by the scientific revolution, at least by comparison with an industry such as agriculture. Average productivity in agriculture has increased almost twenty times in the last hundred years. The technology of teaching is still not very different from what it was in the days of Plato. This is particularly true in the universities; in grade schools and high schools unquestionably there is a greater variety and much more use is made of educational tools such as movies, film strips, and other visual aids and there is even a small move into computer-assisted instruction. It is still very doubtful, though, whether much more knowledge-value is being produced per hour of teacher time or per real dollar of total expense than it was a hundred years ago, or even twenty-five hundred years ago. There are very good reasons for this "backwardness" of the educational industry. Its basic field of operation, the human nervous system, is a system of such fantastic complexity that scientific knowledge about it proceeds very slowly and only encompasses a minute fraction of the total system. We know something, by "folk knowledge," about the process by which teaching results in learning, and we must have been doing something right — otherwise we would never have been able to transmit the knowledge stock of mankind to successive generations for thousands of years as we have done. Nevertheless we really do not know *what* we are doing right and we certainly do not know very much about how to do it better. Even the doubling of the efficiency of the educational industry in terms of the knowledge produced per real dollar spent would seem quite beyond our capacity at the moment.

What this means is that the price of education, relative to those commodities being produced under conditions of rapidly increasing productivity, is bound to rise, simply because the relative price structure is so largely a function of relative productivities. Teachers' salaries have to rise at least roughly in proportion to the general rise in incomes and teachers' productivity does not rise in anything like the same proportion. What we have in education, therefore, is not so much an inelastic supply curve, for under given conditions of productivity it is probably not difficult to attract resources into education by a relatively small increase in real incomes obtained from it. What is happening is that the whole supply curve is moving upward and to the right as costs rise. The demand is also probably rising with increased incomes, partly because education is something of a "superior good" which we can afford more of as society gets richer and partly also because with the increase in the stock of knowledge a larger effort is required to transmit it. What we have therefore is something like Figure 1-3. S_0, S_1, S_2 show successive positions of the supply curve of education in successive years, and D_0, D_1, D_2, positions of the corresponding demand curve in these years. The position of equilibrium rises from E_0 to E_1 to E_2 with both the price and quantity of education rising as time goes on. The less the demand rises, of course, the smaller will be the rise in both the price and the quantity. If demand did not rise at all in the face of this increasing real cost we might find the price of education rising and the quantity actually falling as time went on, following the path E_0, E_1', E_2'.

Demand for Different Kinds of Education

Up to now we have assumed implicitly that education was a homogeneous commodity. In practice we know education to be a very heterogeneous commodity indeed. It is not only that the industry is divided into public and private schools, into secular and religious schools, into Catholic, Lutheran, and others, but also that education is divided into vocational and technical edu-

Fig. 1-3



cation of a large number of different kinds as well as general education, also of a number of different kinds. The demand for each of these different kinds of education is different, although all these demands are likely to be related. The demand for private schools, for instance, is going to be related to the quality and cost of the public schools. The dynamic patterns of the interrelationships may be of great importance. We are all familiar with the problem faced by a public school system once it deteriorates to a point where wealthier parents are willing to send their children to private schools and then are unwilling to vote for adequate school taxes. We may find the same phenomenon in communities with strong religious groups where a large private grants economy goes into the parochial schools and therefore the community is unwilling to tax itself for the benefit of public schools which a large proportion of the population does not use.

Some economists, such as E. G. West,[2] have made rather cogent arguments that the existing system of public education prevents the development of variety and competition in the educational industry. They recommend a system by which education would be subsidized by means of vouchers given to all children, and exchangeable for education at any approved school whether public or private. This, it is argued, would permit much greater experimentation and specialization in schools and also permit parents with a particular concern for education of their children to supplement the state subsidy, that is the voucher, by additional payments. The impact of schemes of this kind is not easy to predict. One of the arguments for uniformity in education is, of course, that it is necessary to create a society which is homogeneous enough not to fall apart politically. This presumably is one rationale behind the current pressure for racial integration in education. Educational segregation would create a two-part society which is repugnant to our present sense of social justice and our demand for societal homogeneity. It could be argued, on the other hand, that uniformity is not necessary for political stability, and indeed an enforced uniformity may produce a society which is dull, conformist, and without color and interest. The concept of a "mosaic society" of many different subcultures all living together at peace within some political framework has a great attractiveness as we move towards a world in which the great period of human expansion is over.

Life Experience and Demand for Education

These are very fundamental questions for educational philosophy and are well beyond the scope of supply and demand analysis. But it is important to recognize that they do underlie the apparent simplicities of supply and demand and that we should not be deluded by these simplicities into forgetting that the real world is enormously complex and multivariate. When we introduce the fact that both the demand and supply of education are a result of a long and continuous process of social learning, the situation gets even more complex. The demand for education arises not from its recipients, as we have seen, but from those adult members of society whose decisions determine the supply of funds. Their demand depends in no small measure on the childhood and indeed the total life experience of these same people. People who were deprived of education in their youth and who observed other people benefiting from it are likely to have a very strong demand for education for their own children. People who received education gratuitiously and who perhaps took it for granted may not have the same motivation when it comes to making personal sacrifices for the education of their own children. I have heard the observation that the current increasing unwillingness of state legislatures to allocate funds, especially to higher education, as compared to a generation or two ago, is related to the fact that many state legislators, say at the beginning of this century, had not been to college and hence had rather romantic ideas about it and wanted very much to have their children enjoy the privileges of which they had been denied. Today most state legislators have been to college and do not have the same romantic illusions about it; hence they are less willing to make sacrifices for their children than their fathers and grandfathers were. These are learning processes of great complexity. We cannot do much more than note that they exist.

OTHER FACTORS AFFECTING THE DEMAND FOR EDUCATION

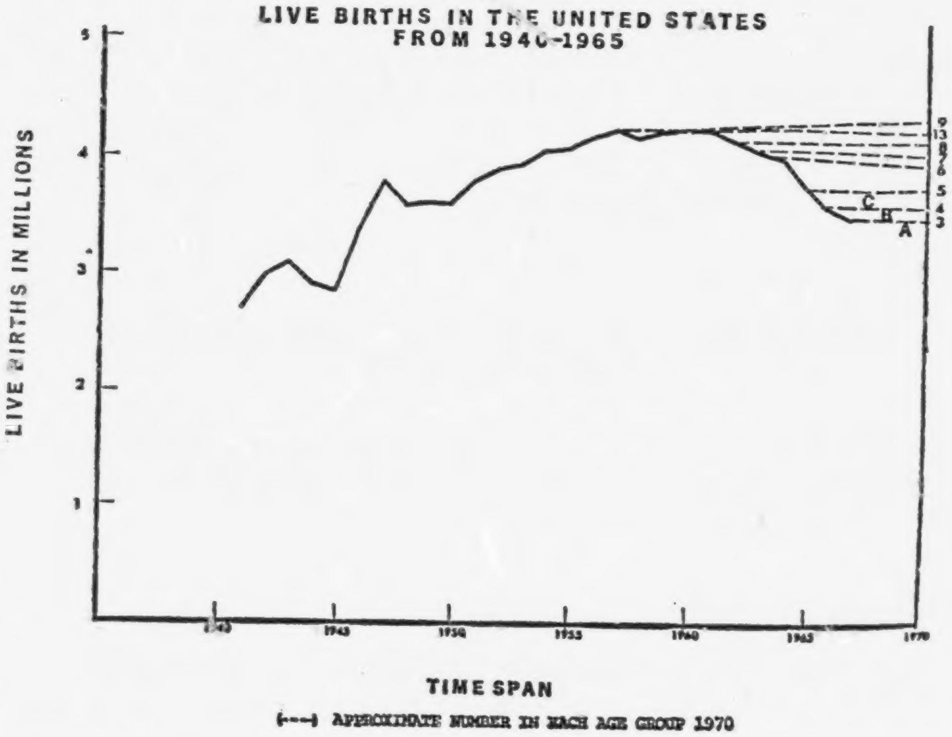
With this analysis behind us, let us now take a look at other forces which may affect the demand and supply of education in the next ten or twenty years.

Demographic Factors

The first important factor is, of course, demographic change, especially as reflected in the total numbers of people in each age group in different years. Demographic change is dominated by the principle that anyone who is X years old today will be X + 1 years old this time next year if he is not dead. Consequently, if we have a fair idea of the survival distribution of each cohort, that is, the proportion of all those born in a given year who will die each subsequent year, then we can take the number of births in a given year and follow the cohort through until it finally disappears. Thus in Figure 4 we show the total number of births in the United States from 1940-69. The "bulge" from 1945 to the 1960s is very apparent. It is equally apparent that the bulge is now over. The peak of total births in the United States was 1957, and this cohort is likely to be the largest age group for a good many years to come. The dotted lines show approximately the survival function from each cohort, excluding immigration, so that in 1970, for instance, A shows the number of three year olds, B the number of four year olds, C the number of five year olds, and so on. The top of the bulge is now passing through the high schools. Obstetric wards and kindergartens are beginning to empty and lower grades are declining rapidly. Between the ages of five and fourteen we can

Figure 1-4

LIVE BIRTHS IN THE UNITED STATES FROM 1940-1965



assume that the proportion of each age group that is in school is very high and is not likely to change much. As we move into the later years of high school, dropouts become important and in college, of course, the proportion of the age group actually attending school is less than 50 percent. At this level changes in the proportion attending school may be as important as the number in each age group. One thing that is certain is that the pressure on the American educational system, which has been intense in the last ten years, will continue to diminish as we move into the future. The 4.3 million babies of 1957 who are now teen-agers will be replaced by only 3.4 million babies in 1969 as teen-agers by 1982. Insofar as the "youth problem" in the United States has been the result of the "bulge" and the unusual numbers of young people, we may expect this problem to diminish in the future. It is hard to say how much is due to the bulge and how much is due to long-run forces in our society resulting, for instance, from the unprecedented segregation of teen-agers in high schools and of young adults in colleges. But we may certainly expect to see amelioration of the unemployment problem among young people simply because labor markets are somewhat age-specific. The high unemployment among young people in the last ten years has reflected in part the very large numbers of them. As the proportion of young people declines, it should be much easier for those who wish to do so to obtain employment.

The implication of the current demographic situation for the colleges is extremely complex. Even if there is no change in the proportion of each age group entering college, freshmen enrollment should increase at least up until about 1974 or 1975. The increase will not be large, and may soon be followed by a substantial decline. There are already signs of severe oversupply of college teachers, especially Ph.D.'s in fields like philosophy, languages, the humanities, and even physics. This is likely to lead to a reduction in graduate school enrollments and thus further reduction in the demand for college teachers. It will not be surprising, therefore, to find an increased number of Ph.D.'s teaching in junior colleges or in high schools. It is a moot point of course, as to whether the conventional Ph.D. is particularly good training for this kind of teaching and it may well be that some retraining programs will be necessary.

One very curious consequence of the "bulge" which may have some implications for the educational system is that there is now a severe deficiency in marriageable males. The groom in the United States averages two or three years older than the bride. The large cohort of girls in 1947 is going to try to marry the small cohort of men of 1944 or 1945; the deficiency may be as much as half a million. It is not perhaps surprising therefore, than an unusual amount of unrest has appeared among women as reflected in the various women's liberation groups. As the unmarried famale is an important labor market source for the educational industry, the next few years may see an unusual number of women entering the teaching profession.

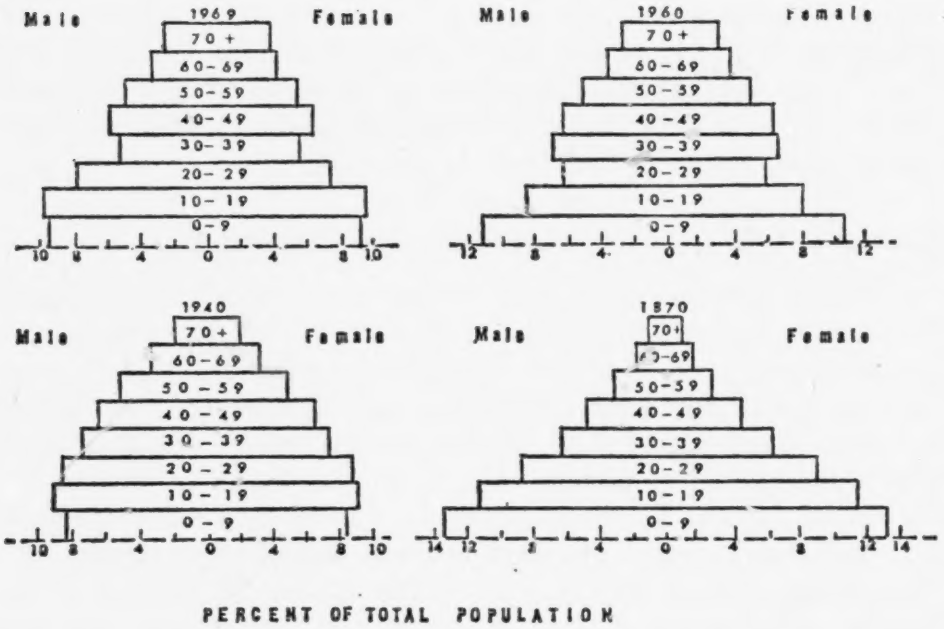
We have not ventured to predict with any certainty the number of births in the future, as it is extremely dangerous to predict linear trends in the birth rate. We would not go very far wrong in assuming that all population predictions are wrong. Even if fertility continues to decline, the "bulge" will begin to marry and presumably have children, so that even with declining fertility (that is, a decline in the number of children per thousand women of childbearing age) we may still have a rise in the total number of births in the next few years. However, in light of the general anxieties about the future and the population-ecology syndrome, it would be somewhat surprising if births increased very sharply. How close we now are to stabilizing the population of the United States may be brought out by reflecting that a stable population of 210 million where the average age of death is 70 would have 3 million births a year. If we achieve this, it would mean that no further expansion of the educational system would be necessary as far as number of students is concerned, at least up to the middle of high school, simply because we are so close to 100 percent of each age group in school now.

Demographic Changes in Older Age Groups

Demographic changes in the older age groups are also of great importance in assessing the demand for education, as it is these age groups that ultimately make the decisions. There is a long-run shift in the overall age distribution from the "triangle" of earlier times to the "rectangle" which we are so rapidly approaching, which has about equal numbers in each age group. The change from 1870 to 1909 is shown dramatically in Figure 5. This means that the proportion of voters of child-

Fig. 1-5

DISTRIBUTION OF THE POPULATION, BY AGE AND SEX: 1870—1969



SOURCE: Population Estimates and Projections, U.S. Department of Commerce, Series P25, No. 441, May 19, 1970.

bearing age has been declining, which means again that we have to rely on the much weaker "grandparent motive" rather than the parent motive for political support of educational expenditures. When the present "bulge" gets to be grandparents in the early twenty-first century, it will dominate the voting population and the effects on educational expenditures may well be disastrous. Now, of course, this "grandparent effect" is modified by the fact that the grandparent of 1975-2000 will come out of the low birth cohorts of 1920-45. This also means, however, that there may be some deficiency in the numbers of mature people available for positions of leadership, though this effect is offset by the large proportion of these cohorts surviving into middle age.

One long-run effect of the "rectangular" age distribution has received little attention, but may eventually necessitate a drastic change in the educational system. Hierarchical structures tend to be "triangular" with large numbers in the lower (younger) levels and small numbers in the higher (older) levels. A rectangular age distribution means that older people are increasingly squeezed out of the hierarchial structure and lose status. We have hardly begun to think about how to adapt the educational system to this kind of total life pattern in which the chances of promotion become less and less.

Redistributing Income and Educational Opportunity

A question for the future, which is of course much more difficult to answer, is whether there would be any changes in the structure of the demand for education, especially in the differrent age cohorts. In the lower age groups this is mainly likely to be reflected in the demand for increasing quality rather than quantity though there may be an exception to this in the pre-school years. There is likely to be an increasing demand for kindergarten and pre-kindergarten school experiences. The main changes here may be seen in the bottom 20 percent of the income distribution where it is widely recognized that the educational system is grossly unsatisfactory and has contributed to the perpetuation of the poverty subcultures. This, however, is going to require an extension of the grants system for education from local communities to wider state and national communities simply because this is the only way in which income can be distributed from rich communities to poor ones. Bringing up the expenditure per child of the poor communities and states even to the present median would involve a substantial expansion of the proportion of the economy going to education, even if the total number of children were to remain constant. One possible optimistic consideration in this situation is that as the number of children declines educational expenditures are likely to exhibit a lag, as on the whole it is much harder to get things out of budgets than it is to get them in. There may be a considerable possibility here for improving the quality and distribution of education, with relatively constant total educational budgets but declining numbers of children, unless budgets are tied mechanically to the number of pupils.

The Youth Culture and Education

There seems little doubt that there has been substantial improvement in the quality of American education in the last decade, perhaps due to Sputnik, at least in the upper and middle income groups, in terms of an increase in the rate of acquisition of knowledge. The curriculum reforms of the last decade or so have certainly had some effect though it is hard to measure this. The hardest thing to assess is the "moral culture" of children and young people as this is developed by the sheer fact of segregation. This is the first society in human history that has effectively segregated not only its children but its teenagers and a considerable proportion of its youth in situations where the peer group is the major factor in determining the culture and adults are present in a very small minority and often in a quasi-custodial or even hostile role. The effect of this may be quite incalculable and by no means necessarily desirable. In all previous societies youth cultures have been severely modified by the fact that adolescents and young people especially have begun work at an early age and hence have developed into adults in the midst of an essentially adult society in the work situation. Apprentices, office boys, and so on naturally develop some youth culture of their own, but it is greatly modified by the fact that for a good part of the day they have to conform to the adult culture around them.

Today we have a segregated youth culture which has an enormous dynamic of its own, quite at odds with the adult culture from which it is so sharply separated. Youth cults, however, are likely to be very unsatisfactory as preparations for a total life pattern. Youth, after all, has no future. A culture which idealizes it and models itself on it is likely to get itself into serious trouble, especially in the demographic situation where the familiar pyramidal age distribution with a very small number of old people being replaced by a rectangular age distribution with large numbers of old people. It may be that the learning process which is going on in the present generation of young people in regard to their attitude toward education may be so radical that when they become adults the whole educational system will be revised radically in the interests of developing satisfactory personal identities, satisfactory whole life patterns of behavior, and an integration of youth with the society in which they are embedded. This, however, is a wild speculation and should not be taken too seriously.

The War Industry Versus the Education Industry

Another set of considerations which must be carried in mind in considering the future of the educational segment arises out of the fact that it is so largely financed through the grants economy. Consequently any changes in the overall structure of the grants economy are likely to have disproportionate effects on education. The major factor here of course is the future of the war industry. If we have substantial disarmament, reducing the war industry down to, say, 4 percent rather than the present 8 percent of the economy, this is likely to release a proportionate amount of the public grants economy for other purposes, to which education is an important claimant. On the other hand if the international situation worsens or if we develop still wilder delusions of national grandeur than we now have so that the war industry expands, we can expect one of the major victims to be public expenditures on education. Where the future of the international system is so uncertain we have to be extremely "liquid" in our planning. Educational planning in particular must be prepared for the unexpected. We should be prepared both for good times and for bad.

Effect of Methods of Financing Education on Expenditures

Another possible future set of changes here, which it is at least not absurd to contemplate in the next ten or twenty years, is a radical change in the methods of finance of education which might produce quite large changes in structure. Thus, suppose that we had something like the "Killingsworth plan" as I have been calling it,[3] for setting up educational banks which would lend students the full cost of their education, the loans to be repaid by a surcharge on income tax throughout the subsequent life of the borrower. The surcharge would not need to be large, perhaps 1 or 2 percent for higher education. The person benefited most in terms of increased income would pay most and we would at least get education out from under the grants economy in part into something that looks like the market sector, thus at least avoiding the stigma of "charity." Unfortunately this proposal, which seems to be eminently sensible, has run into severe political opposition especially from the Association of Land Grant Colleges. It certainly merits serious political consideration. If we run into continued "taxpayers revolt" as we are all too likely to do, proposals of this kind may be much more politically acceptable. The proposal, after all, is based on a very fundamental truth, that for the individual who receives it, education is an investment and frequently a very good investment, and there seems to be no reason why we should not devise financial institutions to recognize the fact. Education as an investment, of course, is not the same as investment in a house, and obviously cannot be financed by a chattel mortgage. The fact that it is a peculiar kind of investment, however, does not eliminate it as an investment, and we should be able to devise peculiar financial instruments and institutions which could deal with it.

Technology and the Education Industry

Another element of the current situation which is extremely hard to appraise is the future interaction between education and business, particularly in the form of new educational hardware technology. Beginning about 1965 there was a great flurry of interest in American business corporations in this problem. A number of established corporations such as Xerox, Raytheon, RCA, IBM, Westinghouse, and General Electric allied with Time, Inc., which established the General Learning Corporation, have all either acquired educational subsidiaries or have developed divisions in this field. In addition some old established publishing houses, especially McGraw Hill, Appleton-Century-Crofts, and Crowell-Collier-Macmillan, have been edging into the business of educational hardware and there are a considerable number of new and small enterprises any one of which might conceivably turn out to be an incipient educational IBM. A considerable controversy has been raging, centering around Antony Ottinger,[4] around the possible value of all these new developments, and here again, almost like the future of the war industry, one simply has to advise a "wait and see" policy. Up to now at any rate there are no signs of the "Model T" among educational hardware and even fewer signs that anyone is capable of driving it. Up to now there is not all that much challenge to the ancient inventions of the book and the teacher—the latter especially being a remarkable nonlinear computer of fantastic capacity which is produced mostly by unskilled labor. Nevertheless in this field, as in many others, one has always to be prepared for the unexpected.[5]

One can express modest confidence, however, that any major change in the educational industry will have to be a combination of financial, organizational, and technical changes. Of these it is quite possible that the financial and organizational changes will have to come first. As long as the near-monopoly of the public school system exists intact, substantial technical changes are unlikely to be forthcoming. A very tantalizing question for the future is the mixture of public and private enterprise in the educational industry. It is easy to underestimate the size of the private sector even now, especially if we include the kind of training programs which go on in industry outside the formal educational system. These fall more in the category of adult education and have a very different set of problems from the education of children and young people. A change in methods of finance to one which subsidizes the student rather than the school might indeed set off drastic changes in the organization of the whole industry. This seems unlikely in the next ten years. About the only conclusion we can safely draw from this discussion is that the future of the educational industry in regard to its structure, if not perhaps in regard to its overall size, is highly uncertain. It may look very different in ten or twenty years or it may look much the same as it is now. This may be a somewhat depressing conclusion, but honesty demands it.

FOOTNOTES

1. Fritz Machlup, *The Production and Distribution of Knowledge in the United States* (Princeton University Press, 1962).
2. E. G. West, *Education and the State: A Study in Political Economy* (London: The Institute of Economic Affairs, 1965).
3. Charles C. Killingsworth, testimony to the United States Senate on Employment of Manpower, September 20, 1963. Also, *How to Pay for Higher Education*, Presidential Address to the Economic Society of Michigan (1967), mimeo.
4. Antony Ottinger and Sema Marks, "Educational Technology: New Myths and Old Realities," *Harvard Educational Review*, 38, 4 (1968).

[5] "Expecting the Unexpected: The Uncertain Future of Knowledge and Technology," in *Prospective Changes in Society by 1980 Including Some Implications for Education*, Edgar L. Morphet and Charles O. Ryan, Reports Prepared for the First Area Conference. Designing Education for the Future. An Eight-State Project (Denver, Colorado, July, 1966), pp. 199–215.

THE SUPPLY AND DEMAND FOR GRADUATES OF HIGHER EDUCATION: 1970 TO 1980

BY LAWRENCE B. DeWITT AND A. DALE TUSSING

I—Introduction

There are persistent and widespread reports of a surplus of highly educated manpower. Corporate personnel departments' visits to college campuses declined sharply the past 2 years. College graduates are reporting great difficulty in finding employment. Many M.A.'s are experiencing similar employment problems, while even larger proportions of Ph. D.'s are finding themselves in a glutted market. And most serious of all, there appears to be a large and growing surplus of elementary and secondary school teachers.

A major problem in assessing the nature and duration of these manpower surpluses is to distinguish the longer term, fundamental manpower imbalances from the shorter term, recession-induced imbalances. For instance, in a year when General Motors and Prudential Insurance are each hiring only 500 new B.A.'s,[1] it is not surprising that many B.A.'s are having difficulty finding jobs. Nonetheless, it is not possible to dismiss all of the current surplus of highly educated manpower as a direct result of the recession. It is necessary to "look underneath" the recession to see if it is simply exacerbating a more chronic skilled manpower surplus.

The conclusions of this investigation can be briefly summarized. (1) The unemployment rates for college graduates, teachers, and Ph. D.'s are quite low. (2) An uneducated person is more likely to be unemployed in 1971 than an educated person. (3) There is currently no evidence of a chronic surplus of B.A.'s, nor is it anticipated that one will emerge in the 1970's. Certain academic disciplines at the B.A. level, however, may show fundamental surpluses; others are expected to show shortages. The net, aggregate picture, however, is one of balance of supply and demand. (4) In the aggregate, there does not now appear to be a chronic surplus or shortage of Ph. D.'s. But a chronic surplus of Ph. D.'s is strongly expected to emerge in the 1970's, and it is already evident in certain academic fields, such as languages and philosophy. This surplus should become more evident in the next several years. (5) The most serious long-term or nonrecession based surplus concerns elementary and secondary school teachers. Its impact is beginning to be felt now, and it should intensify in the next several years. (6) One of the most publicized and "spectacular" current manpower surpluses has been experienced by highly skilled and trained scientific personnel who have been employed in the aerospace and military hardware areas. These scientists and engineers have apparently suffered this unemployment as the result of simultaneous cutbacks in Federal research and development expenditures, and cutbacks in NASA, military, and SST expenditures. At least some increased unemployment would be expected for such specialized workers at a time when Federal moneys are being reallocated away from their area of specialization—even if it did not coincide with a recession. The recession, of course, makes it all the more difficult for them to find new employment.

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[1] *Time Magazine*, May 24, 1971, p. 50.

II—THE IMPACT OF RECESSION ON ACADEMIA

Before we go into a somewhat detailed look at the supply and demand projections for B.A.'s, Ph. D.'s, and teachers, some observations on future patterns of unemployment during recessions should be made. During a recession, companies seek to delay all postponable expenditures. New investments have usually been a major element in this category. Historically, the most severe effects of recessions have been on construction, investment in new productive facilities, and other durable goods. The economy of the 1970's and 1980's will be marked by much greater cyclical unemployment of scientists and engineers, and others in the software, long-term capital sectors. This will become a more serious social problem as the size of the nation's research and development effort grows, for it will mean a larger number of individuals will experience dislocation and unemployment. And the hardest burdens will fall on those with skills least easily transferred to other activities, and those who most recently entered the labor force.

This increased sensitivity of research and development expenditures has very direct implications for higher education. In the postwar years, institutions of higher education have increasingly served as auxiliary research wings of corporations and Government. Until 1969–70 the relationship was one of mutual benefit. The institutions of higher education served, in effect, as the "Kelly Girls" of the research area. They provided an elastic supply of highly trained and well equipped research talent which became available almost on demand. However, unlike an in-house research department, these research "wings" did not represent a fixed cost in terms of facilities, salaries, and fringe benefits. That is, when no longer needed, academic researchers could be dispensed with fairly easily. In effect, considerable business and budget risks was shifted from Government and industry to academic institutions. A major result of this is that academic institutions, which once were fairly well insulated from the effects of the business cycle, now must expect to be increasingly influenced by changes in that levels of economic activity.

III—THE NATURE OF LONG-TERM, SKILLED MANPOWER PROJECTIONS

Before reviewing and sumarizing the various projections which have been made on the supply and demand for B.A.'s, teachers, and Ph. D.'s, it is important to note several general points that apply to all three of these manpower categories.

A. LONG-TERM PROJECTIONS OF SKILLED MANPOWER SURPLUSES

Forecasts which anticipate continuous surpluses of educated persons must be viewed with considerable skepticism. To be credible, they must provide an answer to the question: Why would individuals continue, year after year, to seek the costly and often grueling training required especially that for a Ph. D., if it was apparent that many of them would be unable to find employment which satisfactorily utilized that training? Short-term oversupplies of educated persons seem a reasonable possibility or expectation, since there clearly are timelags in the adjustment of supply and demand. But this lag is probably of about 2 or 3 years duration, and certainly would not apply to 10 or 15 year forecasts. Moreover, while we might allow for the possibility of ignorance and misinformation in leading to a chronic oversupply in some occupations, the fact that we are here dealing with educated manpower would seem to preclude that explanation or basis for a chronic oversupply.

Very few of the forecasts with which we are familiar dealt with this very fundamental question. For the most part, these forecasts were based upon trend extrapolation of some form. Supply and demand of skilled manpower were projected separately and without interaction. This is simply not a reasonable or legitimate basis for forecasting. It assumes that people act without reference to past and present experience, not to mention future expectations. We should hasten to add, however, that it is not impossible for a continuous or long-term oversupply of Ph. D.'s to occur. It is possible. And it is possible to make a reasonable and legitimate forecast which anticipates such a development. But some rationale must be provided to explain why people and institutions do not respond to the year after year oversupply in some way that reduces or eliminates it.

There are a number of reasons why a surplus of highly educated workers might persist for a long period of time. Several of these are summarized here. First, there is the possibility that, although it is common knowledge that there have been and are too many B.A.'s, teachers, or Ph. D.'s, a sufficient number of applicants for training in these areas feel that they individually will "make it," so that the surplus persists. Although undeniably possible, this seems rather unlikely.

The more "marginal" (in terms of ability and commitment) students would tend to become discouraged, and abandon their programs. Even now, some of the better doctoral candidates and applicants to schools of education are becoming discouraged. And given the lengthy training period involved, this is likely to be a considerable damper on the supply of teachers and, especially, Ph. D.'s. Furthermore, there are constant demands in academic departments for "upgrading" the quality of their programs. Most often this really means getting better students and/or raising the requirements for attaining the degree. Departments faced with difficulty in placing their graduates in "satisfactory" employment are almost certain to find such "upgrading" more tempting, if not, simply, the only fair and reasonable thing to do.

There are several other rationales for a long-term surplus of highly educated personnel that involve unusual circumstances. For instance, it is possible that such a surplus exist and persist because the absolute demand for personnel in a certain field may fall at a rate exceeding the rate of death and retirement of existing job holders. Another possibility is that the forecasts of demand for such workers be continuously in error. Although manpower forecasts have approximated "continuous error," they have tended to fluctuate between overestimation and underestimation.

There is, however, one other possibility which is not so easily dismissed. It is based upon the fact that highly educated people—even when there is a surplus of them in their fields of specialty—find better jobs than they could without a degree. Those seeking specialized jobs in fields which are experiencing manpower surpluses must accept either a probability of unemployment or underemployment, or a period of unemployment or underemployment. That is, new students enrolling in specialized courses of study in which there is already a surplus of personnel do not confront lifelong unemployment. Depending on market conditions, such a student may tell himself:

(1) I have a 75 percent chance of landing a job in my chosen field and in any case I will get some kind of job which is probably better than I could get without the degree, or;

(2) With my degree I will face unemployment or serious underemployment for 6 months to a year before getting a job in my field.

In spite of a personnel surplus, if the absolute number of jobs grows, or if there is any attrition at all, students may voluntarily accept unemployment or underemployment as the price of getting into a desired field.

Thus it appears that the only very likely condition under which a chronic surplus of educated persons could persist would be where it was, in effect, voluntary. Ironically, this appears to be the case with educated persons in some underdeveloped countries, including India.[2] Economic and other advantages accruing to educated persons are so great, relative to the costs of obtaining an education (a publicly subsidized cost) in a number of professional fields, that a chronic surplus of persons in particular skill categories could persist. We do not suggest that this "explanation" will necessarily apply to the United States. Rather, our argument is only that such a chronic surplus is in fact possible, and that were it to come into being, it would be voluntary on the part of those constituting the oversupply, and would be financed in large part by public expenditures.

A further explanatory note is perhaps necessary. We do not see a chronic involuntary oversupply of skilled manpower as at all likely. Thus, for example, we heavily discount some projections we have heard which forecast 500,000 to 600,000 unemployed teachers by 1975, rising to a level of about 1 million by 1980. Developments such as this, without countervailing adjustments, we see as unrealistic and untenable. But such forecasts—based on independent trend analyses of supply and demand—do serve to indicate the scale of the adjustment process which must and will be undergone in bringing supply and demand into some sort of balance. That is, the size of the spread between independently estimated supply and demand is an index of the magnitude of the adjustment problem.

B. UNEMPLOYMENT AND UNDEREMPLOYMENT

No one, to our knowledge, has suggested that skilled manpower is likely to confront serious levels of chronic unemployment. The serious problems of unemployment are borne almost exclusively by individuals with low educational attainment. Short of a major depression, we see no change in this condition. Although some B.A.'s, M.A.'s and Ph. D's are unemployed, and although it is doubtless true that their rate of unemployment rises when they are in oversupply, this unemployment rate is no sense adequately measures the extent or the nature of the problem. First, for every highly skilled unemployed individual there may be four or five more highly skilled individuals who are underemployed. Unemployment rates, then, will understate the extent of the problem. Second, use of unemployment rates are misleading about the nature of the problem simply because underemployment, not unemployment, is the major problem confronting surplus, highly skilled workers.

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[2] See Mark Blaug, Richard Layard, and Maureen Woodhall, "The Causes of Educated Unemployment in India," forthcoming.

In a methodological sense, it is unfortunate that unemployment is not the appropriate index of oversupply of manpower. It is extremely difficult to measure underemployment. The concept is filled with definitional ambiguities. In his recent book on this subject, Ivar Berg [3] finds that by using one set of assumptions about skills required for specific job categories it is possible to conclude that there is massive overtraining of American workers. But, using only slightly different assumptions about such job requirements, he is led to the conclusion that there is little or no such overtraining. Berg did discover, less ambiguously, that frequently workers with less education were more productive than worker with more education who were doing the same job. It can be hypothesized that this was due to the greater frustration or lessened challenge of the work for the more highly educated workers. But other explanations are equally possible, such as the irrelevance of much of formal education to job performance. This issue, too, remains problematic, although the sympathies of Berg are evident in the subtitle to his book: "The Great Training Robbery."

C. CREDENTIALISM

The problem of credentialism is inextricably linked to the problem of underemployment. The ethic that "education is good and more education is better" is a deeply ingrained social norm. It is widely assumed that, other things equal, the more educated worker is the better worker. For certain jobs this is unassailable. But for a large number of jobs it is suspect; in others it is clearly not the case, Berg's findings indicate.

In part, the problem of credentialism is an education-based one. It is in the interest of the educators that education be highly valued. But credentialism is also very largely an employer-based problem. As long as employers place a high value on educational credentials per se, the problem will remain. It may be, however, that employers are beginning to question the merits of educational certificates. Many employers claim that they have been aware that, for many positions, the skills learned in education are either not relevant or are more than needed to perform the job tasks. Instead, they claim to have been using educational attainment as an indicator of other, less easily measured, personal traits, such as persistence, responsibility, commonsense, imagination, and so forth. Ivar Berg's findings along with the findings of others may signal the beginning of a rethinking of these assumptions by employers. There is considerable stimulus for employers to make such reassessments, since the more highly educated workers command higher salaries.

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[3] "Education and Jobs: The Great Training Robbery," Praeger, New York City: 1969.

Nonetheless, there is a very real danger that the employment market rather arbitrarily uses educational credentials to ration jobs. It seems possible, perhaps likely, that one of the major consequences of increasing educational attainment is that defined educational requirements of jobs rise at a more rapid rate than actual educational requirements of jobs. And this, especially, is a major possible consequence of excess supplies of highly educated individuals.

IV. SUPPLY AND DEMAND FOR B.A.'S, TEACHERS, AND PH. D'S: 1970–1980

We now examine, in turn, the potential surpluses of college graduates, schoolteachers, and doctors of philosophy.

A. COLLEGE GRADUATES

In our opinion, there is no surplus of college graduates in general. There may be temporary surpluses of particular specializations, but with the exceptions of schoolteachers, discussed separately below, these temporary imbalances do not appear to differ from those of past years.

Our judgment is based on three perspectives.

First, while there is some evidence of unemployment of recent college graduates, we have no evidence to suggest that this unemployment exceeds what could be attributed to the cyclical, short-run structural causes discussed above. In a recession/structural change situation sufficiently severe that employers are laying off and dismissing some employees already on their payrolls, it is not surprising that they are hiring fewer new employees. And the problem is made more severe by the very large size of the graduating class, 816,000.

Second, currently available projections of the demand and supply for college-educated workers indicate no overall surplus, though a surplus is suggested in some categories, particularly mathematics, life science, and elementary and secondary schoolteachers.[4] Indeed, the same projections imply significant shortages of certain college-trained personnel, including some categories of scientific manpower.

The Bureau of Labor Statistics forecasts are based on highly sophisticated economic forecasts.[5] The Educational Policy Research Center has recently published its own forecasts, made with somewhat different assumptions and using somewhat different, though also highly sophisticated, methods.[6] Table I provides a comparison. Note that the BLS forecasts are somewhat higher for given assumed average rates of unemployment, and that the BLS expects a higher fraction of gross national product to be devoted to consumption expenditure than is forecast by the EPRC. The principal reason for both differences is that the BLS assumes a population growth rate of 1.3 percent, while the EPRC has revised its population-growth forecasts downward to 1.0 percent, in line with recent trends. A lower rate of population growth (which we believe to be the correct choice) implies a somewhat different mix of jobs as well, including more public-service jobs in general, but fewer elementary schoolteachers (by 1980) than have been forecast by BLS.

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[4] "College-Educated Workers, 1968–80," Bulletin 1676, U.S. Dept. of Labor, Bureau of Labor Statistics, 1970. Joseph Froomkin, using methods similar to those employed by the BLS, has also concluded that aggregate supply and demand for B.A.'s will be in approximate balance during the 1970's.

[5] "Pattern of U.S. Economic Growth," Bulletin 1672, U.S. Dept. of Labor, Bureau of Labor Statistics, 1970.

[6] John A. Henning and A. Dale Tussing, "The U.S. Economy Through 2000: Forecasts of Major Macroeconomic Variables," working draft, Educational Policy Research Center, April 1971.

TABLE I.—FORECASTS OF 1980 GROSS NATIONAL PRODUCT AND PRINCIPAL COMPONENTS, 1958 DOLLARS, BUREAU OF LABOR STATISTICS AND EDUCATIONAL POLICY RESEARCH CENTER

	Billions of 1958 dollars			Percent distribution	
	BLS	EPRC	BLS	BLS	EPRC
Assumed unemployment rate (percent)	3	3.5	4	3.0	3.5
GNP	1165.0	[1] 1129.8	1155.0	100.0	100.0
Consumption	758.3	682.2	751.9	65.1	60.4
Government	210.8	262.3	208.9	13.1	23.2
Investment [2]	195.9	181.2	194.2	16.8	16.4

[1] For unemployment equals 4.0 percent, GNP equals 1125.7.
[2] Gross domestic investment plus net foreign investment.

Source: For BLS projections, Patterns of U.S. Economic Growth, B.L.S. Bulletin 1672. For E.P.R.C. projections, Henning and Tussing, "The U.S. Economy Through 2000: Forecasts of Major Macroeconomic Variables," Working Draft, April 1971.

These forecasts, especially the differences among them, point out a major difficulty of manpower forecasting. Manpower projections necessarily must be based on a number of other projections of various social and economic variables all of which are subject to considerable disagreement and uncertainty. When the various projections are combined, the uncertainty of each is compounded with the others. And the above estimates indicate that even the highly sophisticated econometric forecasts differ considerably.

B. SUPPLY AND DEMAND FOR TEACHERS, 1970–1980

The single area of unanimous agreement in occupational forecasting is that there will be a surplus of teachers in the coming decade. This results from several major developments. First, we are now in the midst of a decline in the absolute number of children entering and going through our elementary and secondary school system—this is simply a demographic reality. Second, a steadily increasing percentage of our college graduates have become eligible for teaching jobs. The percentage of all bachelor degree recipients who are eligible to teach has risen from about 30 percent in 1955 to about 40 percent in 1970.[7] Combining this with the large expansion in the absolute number of college graduates results in a truly enormous and continuing growth in the total number of eligible teachers being produced each year.

The projections with which we are familiar are in much agreement on the future demand for elementary and secondary school teachers.[8]

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[7] National Education Association, "Teacher Supply and Demand in Public Schools, 1970," 1970–R14.

[8] James Byrnes, on-going research at the Educational Policy Research Center, Syracuse; National Center for Educational Statistics, "Projections of Educational Statistics to 1970," 1970–R14.

They foresee a need for about 2.2 to 2.4 million active teachers for each year of the period 1971 to 1970. They are based on the assumption that the pupil-teacher ratio remains at about its present level of 22 or 23 to 1. By using data collected by the National Education Association,[9] it is possible to make rather crude estimates of the annual requirement for newly graduated teachers.

In doing so, we make the following assumptions:

(*a*) Demand for 2,400,000 teachers each year.

(*b*) Past trends continue in the flow of teachers to and from the ranks of "active" and "inactive" teachers. This means a net decrease in the ranks of active teachers of about 5 percent per year.

(*c*) The annual retirement of teachers is in the range of 20,000 to 30,000 per year in the 1970's.

We can then estimate the annual "requirements" for new teachers as being 5 percent of the (constant) number of teachers (2,400,000) plus an amount needed to replace retiring teachers (about 25,000). This yields an annual demand for recently graduated teachers on the order of 145,000 per year for the 1970–80 period.

We have been unable to discover existing projections of the supply of new teachers graduating in the 1970's. Data are available on the number of new B.A. recipients who are eligible to teach: currently about 39 percent of all new B.A.'s are eligible. In absolute terms, this means about 291,000 potential new teachers. But this does not mean that all of these "eligibles" majored in education; in fact, about 40 percent of them did. Nor does it mean that all of them are even interested in teaching. Historically, about 75 percent of the "eligibles" have gone directly into teaching. If this were true this year, it would mean that about 218,000 new graduates would be seeking teaching jobs. If about 40 percent of all B.A. recipients continue to be eligible to teach, and if about 75 percent of these "eligibles" continue to desire teaching jobs, we would expect that the number of new, qualified B.A.'s who were seeking teaching jobs would rise from about 240,000 in 1971 to about 320,000 in 1980.

The EPRC attempted a survey of schools of education on their expectations concerning the number of graduates for the next 3 years, as well as information on the level of applications for the coming year in comparison to the levels of previous years. However, it was impossible, given the short time involved, to collect such data, and the effort was abandoned. But what we found most revealing was that none of the four or five schools we talked with before abandoning the project appeared to have such data readily available. We took this as some indication that the forecasts of great teacher surpluses in the 1970's do not appear to have had a startling impact on the schools of education. Our effort, of course, was limited in scope, so we cannot be too assured in this conclusion.

The most recent National Education Association "Teacher Supply and Demand in Public Schools" report is also dismaying in that it appears to be oblivious to warnings of impending surpluses. All of their language, quality criteria, and analyses focus on the continuing teacher shortage crisis.

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[9] National Education Association, "Teacher Supply and Demand in Public Schools, 1970," 1970–R14 .

There is another very alarming portend about the oversupply of teachers in the 1970's. Lewis Mayhew, in his report, "Graduate and Professional Education, 1980," found that institutions in the United States planned on creating 39 entirely new schools of education, while none of the existing ones were slated for elimination. Since these data are based on questionnaires filled out in 1967–68 while the higher education boom was at its zenith, and the impact of the crisis in financing higher education had not yet arrived, many of these plans may have been scaled down. As Cheit discovered in another Carnegie Commission Report, schools facing financial crisis tend to take as a first step the deferral of planned new programs and facilities.[10] But this remains an unknown, and an updating of these data would be most useful.

It is perhaps useful here to reiterate a point made earlier. We do not in any sense expect the sizable gap between supply and demand for teachers estimated above to come into being. Rather, this gap represents an estimate of the adjustment problem. Either demand will be greater than estimated, supply will be less, or both. We feel certain that supply will be less than the above trend calculations estimate: the trend will change. We are less clear about possible increases in demand, though there are indications that this might occur.

The following sorts of factors would have to be weighed in a more detailed analysis. First, to what extent have the ranks of teacher "eligibles" and teacher applicants been swollen by the Vietnam War? We would expect this source of supply of new teachers to be disappearing rapidly. How many new teachers will be required for expansion of new programs in, say, early childhood education and vocational education? Furthermore, how much increase in demand for school teachers can be expected in the 1970's as the result of expansion of the whole set of "peripheral" educational activities (adult education, correspondence courses, public and private on-the-job training, and so forth)? To what extent is the pupil-teacher ratio likely to decline, thus requiring more teachers than are currently anticipated? Similarly, to what extent will the public focus on raising the rate of high school completion from its current level of about 80 percent? Special and remedial educational programs generally seem to require substantially lower pupil-teacher ratios in order to be successful.

C. PH. D. PROJECTIONS

The notice of a surplus of Ph. D.'s is in many ways the most "spectacular" of manpower imbalances. An unemployed unskilled laborer is hardly novel, while an unemployed nuclear physicist may even be written up in the New York Times. And it is not just the waste of human resources and skills which brings greater attention to the latter—it is also because America has for a long time fervently believed in education, regarding "more" as "better." As already discussed, however, the Ph. D. is unlikely to be unemployed—current estimates of the unemployment rate for Ph. D.'s are in the neighborhood of 1 percent. The more likely problem of Ph. D.'s is underemployment. As yet, there does not appear to be a major underemployment problem for Ph. D.'s—it, also, is currently estimated (as of 1970) at about 1 percent. But there are indications that it may become not only a considerable problem for Ph. D.'s in terms of unmet or unfulfilled career expectations, but also a social problem in terms of misallocated public resources.

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[10] Earl F. Cheit, "The New Depression in Higher Education." New York: McGraw-Hill, 1971.

Numerous projections have been made of the supply of Ph. D.'s between 1970 and 1980. Almost all of them are based on fairly straightforward extrapolations of past trends. However, there are a number of different ways these trends can be extrapolated, and they have resulted in quite divergent anticipated outcomes. For instance, recent forecasts of Ph. D. production in 1980 range from a low of about 40,000 to a high of about 78,000 (compared with an output of about 29,000 new Ph. D.'s in 1970). The estimates of demand for the employment of Ph. D.'s constitute a similar, disparate array of projections.

Despite such differences and disagreements, one theme of consensus does emerge: in terms of traditional forms of employment (R. & D. and college and university teaching) we are confronted with a future surplus of Ph. D.'s. But there is disagreement over the extent of the problem, the nature of the problem, and even whether the surplus really is a problem.

Ph. D. Output in 1980

Listed in table II are a number of projections of Ph. D. output in the year 1980.

TABLE II.—SELECTED PROJECTIONS OF Ph. D. OUTPUT, 1980

12 percent per year [1]	86,000
Mayhew:	
High	77,000
Medium	67,500
Haggstrom:	
High	77,700
Medium	61,800
Low	55,000
National Research Council	71,000
OE (NCES)	62,500
Falk	48,000
Cartter:	
Expected	48,000
Low	4 ,000

[1] The rate of increase of Ph. D. output from 1960-70. We are unaware of anyone who has suggested that this rate will continue; it is presented here as a benchmark for comparing the other projections.

Source: See appended bibliography.

The Syracuse EPRC has not constructed its own forecasting model of Ph. D. production. However, if forced to settle upon one, "surprise-free," or "least unlikely" projection, we would hazard the estimate that about 50,000 Ph. D.'s will be produced in 1980. This is somewhat in the middle of the range of projections listed above, tending toward the lower end. This "tendency" is based on our belief that many of the higher projections did not adequately take into account the persistence of the current financial crisis in higher education, and the strength of the "market response" of potential Ph. D. candidates to the now well publicized "glut" of Ph. D.'s. Furthermore, we feel that some downward reassessments are called for by the current and possibly future disenchantment of many undergraduates with graduate school. Once again, however, projections of graduate degree recipients have been very unreliable in the past, and the state of the art has in no substantial way improved. In this light, we would readily admit that our "estimate" of an output of 50,000 new Ph. D.'s in 1980 could prove to be far from accurate. Nonetheless, such projections must be made despite their shortcomings on the assumption that unreliable projections are better than none.

Demand for Ph. D.'s

It is useful to disaggregate total demand for the services of Ph. D.'s into three sources of employment: college and university teaching, research and development, and "other." Over the past decade approximately 50 percent of the new Ph. D.'s have gone into teaching, around 35 percent have been employed in R. & D., leaving about 15 percent for "other." This disaggregation, though a step in the right direction, is far from complete. For instance, Allan Cartter has estimated that about 90 percent of the Ph. D. graduates in such fields as anthropology, history, and English have gone directly into college teaching. Unfortunately, sufficient data is not available to permit a detailed examination of the supply or demand for Ph. D.'s in the various academic disciplines. For the present, we are restricted to treating Ph. D.'s as a homogeneous group, save for some special references to the sciences, where some projections have been made for particular fields and for science as a whole.

Demand for college and university teachers

Allan Cartter has presented the most detailed picture of the cutlook for employment of new Ph. D.'s in academia. In this section we rely heavily on his approach and data, save for a major quarrel with his assumption about the proportion of all new college teachers who will possess a Ph. D. He assumes that this proportion will remain at its current level, while we assume that it will increase fairly considerably. First, however, we will present his calculations.

Cartter begins with the National Center for Educational Statistics projections on full-time equivalent (FTE), undergraduate enrollments. He then assumes that there will be an increase of one faculty member for each additional 20 FTE students. He also assumes an attrition rate (death and retirement) of existing faculty of 2 percent. Finally, he assumes that universities, 4-year colleges, and 2-year colleges maintain the current percentage of Ph. D.'s on their teaching staffs. All of this leads him to conclude that about 92,000 new Ph. D.'s will be hired for higher education teaching positions in the period 1970–1980.

At noted above, we disagree with his assumption that the current percentage of Ph. D.'s on college faculties will only be "maintained" at its current level of about 44 percent. This seems especially unreasonable when one combines a picture of a surplus of Ph. D.'s (which will act to hold teaching salaries down) with an awareness of the high priority and prestige colleges attach to "upgrading" the quality of their programs by increasing the number of Ph. D.'s on their staffs. Given these two complementary considerations, we find it quite reasonable to assume that as many as 60 percent of all new faculty members in the 1970's will be Ph. D.'s. Even this may turn out to be a conservative estimate. But if 60 percent of all new faculty are Ph. D.'s, this will mean a demand for new Ph. D.'s by academia of 125,000 in the 1970's. This compares with Cartter's estimate of 92,000.

Demand for Ph. D.'s for research and development

It has been found that there is a very high correlation between the total (government and business) expenditures on R. & D. and the employment of Ph. D.'s in R. & D. Dean, Rattner, and Reisman, in research performed by OE and Case Western Reserve University, have estimated that each additional billion dollars of R. & D. expenditure entails hiring 3,500 additional Ph. D.'s.[11] As with the proportion of Ph. D.'s on college faculties, it is reasonable to argue that the proportion of Ph. D.'s hired for R. & D. will rise in the 1970's due to their expected realtive abundance as well as their research expertise. In this case, however, a change in the proportion of Ph. D.'s to other researchers does not make a considerable difference unless the proportion is raised quite drastically.

The Dean, Rattner, and Reisman estimates lead to the conclusion that about 48,000 new Ph. D.'s will be required over the decade for the expansion of the nation's R. & D. activities, while another (roughly estimated) 20,000 new Ph. D.'s will be required to replace current R. & D.'s Ph. D.'s who die or retire. This leads to a total R. & D. demand for new Ph. D.'s of about 68,000 in the 1970's.

Other

We have very little information on this residual category. Presumably, many of them go into administrative, management, and research operations of State, local, and Federal Government, as well as private business. We also know that recently about 15 percent of new Ph. D.'s have fallen into this category. We do not know what percent of this group could be described as underemployed, though we suspect that their numbers are small. A recent "Survey of Doctoral Employment" conducted jointly by the National Academy of Sciences and the National Research Council in early 1970 estimates that only about one-half of 1 percent of recenly graduate science Ph. D.'s are employed in work unrelated to their training. As discussed before, the meaning and measurement of "underemployment" are quite vague. Furthermore, the survey results are based upon reports from department chairmen, not the Ph. D.'s themselves. We would suspect that department chairmen are susceptible to a downward bias in their estimates of underemployment of their recent graduates. Nonetheless, we would have to suspect them of blatant dishonesty were we to posit even so much as a 2 percent underemployment rate for their recent graduates. The same survey also concluded that slightly less than 1 percent of recent Ph. D. recipients in the sciences were unemployed. And this figure is in the range of "frictional" unemployment: unemployment of usually short duration experienced between jobs.

These figures indicates that, at least for the present and recent past, nonacademic, non-R. & D. jobs for Ph. D.'s cannot easily be dismissed as excess or surplus. If there was a surplus, it would show up largely in this category. For the present, there simply does not appear to be much of a surplus.

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[11] "Supply and Demand of Teachers and Supply and Demand of Ph.D.'s: 1971–1980," U.S. Office of Education, Draft, March 1971.

We are left, then, with the difficult task of estimating what percentage of the total Ph. D. supply will be fully employed (in terms of their training) in the "other" category in the 1970's. As noted above, 15 percent of all new Ph. D.'s have been so employed in this area in the past. We see no reason to assume that this percentage will fall.

We have previously estimated that for the 1970's about 125,000 new Ph. D.'s will be required for teaching jobs and another 68,000 will be required for R. & D. activities. This totals to about 193,000 new Ph. D.'s. An additional 15 percent of this total for the "other" category would mean 30,000 more new Ph. D.'s. If the "other" category were to rise to 20 percent (in terms of Ph. D.'s whose training was fully utilized), we would expect an additional 40,000 more new Ph. D.'s rather than 30,000. We find ourselves more persuaded by the 40,000 figure than the 30,000 for two reasons. First, there obviously will be a continued increase in the volume and use of technical information. This should increase the demand for Ph. D.'s, especially in light of the next point. Second, highly skilled and trained individuals to some extent create a demand for their services. This appears to have happened with the tremendous increase of college graduates in the past decade, and we see no reason to suspect that employers will not rearrange a number of job functions and responsibilities in order to utilize at least some of the expanded output of Ph. D.'s.

It should be noted that the ability of the economy to effectively use and call upon the services of Ph. D.'s may be much greater than estimated here. We consider the current unemployment and underemployment rates mentioned above as negligible. It may be that there is an effective demand for Ph. D.'s in business and government which far exceeds the current or even the anticipated supply. It is quite possible that the "other" category has been experiencing shortages of supply the past decade. We simply do not know, and we see no easy way of finding out.

Summary

Our estimate, then, is that there will be a demand for about 233,000 new Ph. D.'s in the period 1970 to 1980. About 125,000 will be required for college and university teaching, about 68,000 for R. & D. activities, and about 40,000 for miscellaneous administrative, management, and research jobs. Our trend analysis estimate of Ph. D. production or supply lead us to estimate that about 400,000 new Ph. D.'s will be generated in the 1970's. This means that we would expect about 165,000 Ph. D.'s to experience some amount of underemployment in the course of the 1970's.

When one looks at the absolute number of Ph. D.'s involved in a potential surplus, and especially when one compares these to the size of the total work force, two observations stand out. First, 165,000 "extra" Ph. D.'s in the 1970's would mean about 16,500 per year. This does not seem to represent a potentially serious social problem, especially when it is realized that very few of them will be unemployed. Second, in terms of the needs of the entire society or economy, we can observe that we are discussing something around two one-hundredths of 1 percent of the total work force. When one considers the uncertainties of manpower forecasting, it may seem that we are here dealing with very "fine-tuning" indeed. We wonder if there really is not enough "give" in the economy to absorb usefully each year the services of an "extra" 16,500 highly intelligent, trained, and specialized workers.

None of this is meant to deny the high cost of producing Ph. D's. It would not be unreasonable to estimate that each Ph. D. produced costs $20,000 in public funds. This means that 16,500 "extra" Ph. D.'s per year would be created at an annual cost to the public of about $330 million. This figure, though, represents an exaggeration of the "social waste," since most of the excess would probably be finding at least a partial use for their training.

V—Policy Comments

A. FEDERAL POLICY RESPONSES

The Federal Government must, naturally, wonder why it should be supporting the production of more teachers and more Ph. D.'s at a time when surpluses are anticipated shortly. A straightforward response would be to sharply reduce such support—and there are clear indications that this is being done.[12] But such responses can have drawbacks serious enough to make their net effect detrimental.

Manpower planning faces enormous difficulties. First, manpower projections (supply and demand) are subject to considerable uncertainty. This uncertainty increases the further projections extending into the future. Projections even 3 or 4 years into the future are extremely risky. And when one adds up the inevitable timelags involved in moving from determining that there will be a manpower problem, to difining a remedy, to implementing the remedy, and, finally, to the time required for the policy to take effect, it is possible that 4 or 5 years will have elapsed. And this may exceed the limits of our ability to frame reasonably accurate predictions of manpower supply and demand. The timelag in policy response, of course, is greater when new legislation is required. But even in the case of effective, discretionary administrative authority, there is still at least a 2-year lag in the output responsiveness of educational institutions.

Here, then there is not only the danger that today's manpower policies attempt to solve yesterday's problems, but also that they contribute to tomorrow's problems. For example, Federal efforts in the late 1960's to reduce the teacher shortage may have contributed to our current problem of a teacher surplus. It is not impossible, though it may seem so, that current public efforts to reduce "future" teacher surpluses will result in worsening a future teacher shortage.

The "big imponderable" in all of this, from the Federal Government's point of view, is the effectiveness of the market mechanism which works to equate supply and demand. To our knowledge no one has constructed a detailed or accurate method for permitting supply and demand projections to interact with one another in a realistic fashion. We are in a very primitive state when it comes to assessing the relative influences of the following sorts of factors: the responsiveness of students to surpluses or prospective surpluses, the responsiveness of graduate schools and departments to surpluses, the "momentum" inherent in new programs and departments which make them relatively oblivious to market surpluses because of the costs already sunk into their creation, and the responsiveness of State legislatures and budget authorities to reports of surpluses. All of those influences must be weighed by the Federal Government in prescribng remedial policies. And there is very little to go on in doing so. We are reasonably confident that the various non-Federal Government factors will move strongly in the direction of equilibrating supply and demand. But how rapidly and effectively they will do so is unknown.

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[12] For instance, the Woodrow Wilson National Fellowship Foundation has reported an 85 percent cutback in federally financed first year fellowships between 1967 and 1972. In 1967, 10,972 new graduate students were supported by federal fellowship programs. By 1972, according to current budget plans, the number will be only 1,570.

Another major problem in moving to curtail Federal support for teachers and Ph. D.'s is to do it in a manner which will not especially burden students from low-income families. For this reason, reduction of student aid assistance may be one of the least desirable methods of dealing with the problem, though it may be the most expedient. This problem is of sizable proportions, since graduate students from low-income families appear to be at least as well represented in graduate education as they are in the population at large.[13] It seems to be of considerable national importance that means be found to retain higher education as a significant avenue of upward social mobility, at the same time that the rate of growth of the output of higher education is restrained.

B. ALTERNATIVE USES OF COLLEGE-AGE YEARS

We have concluded that there is no surplus of college graduates, at least not in the chronic, long-run sense that would imply an educational as opposed to an economic issue. Yet we think it is fair to say that there is a surplus in two important other sense. First, we feel quite sure that there already exists an underutilization of the skills of the existing work force. Second, while we have no objective evidence to justify the view, we assert that if a socially legitimate alternative to college existed for those of college age, fewer persons would enroll in college. One major reason why large and increasing numbers of people attend college is that there is literally nothing else for them to do. The armed services, which were once a legitimate use of this time, appear to be losing some of that legitimacy; moreover, the implication of a 2½ million-man limit on the armed services in the face of continuing increases in the college-age population, implies that this option is being closed to many. Where work was once a legitimate alternative, it is increasingly true that the jobs available to a high school graduate are not gateways to vocations, and that a person who does not attend college must while away his time washing cars, et cetera, before starting his true career at a later age (if ever). This means that there is an oversupply of college graduates relative to what people really want to do, and would do if given the chance.

Given that a fraction of college graduates do not appear needed in the skill sense, and that a fraction of college graduates do not really want to go to college, there seems to be a need for an alternative, career-oriented option for those years.

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[13] Results of a special Office of Education study: "The Academic and Financial Status of Graduate Students, Spring, 1965."

We suggest research into the best form or forms of what we choose to call Alternative College Age Option (ACAO), and into its probable cost. Without benefit of such research, we suggest the following:

1. ACAO should have certain properties of the armed services. It should be thought of as a self-contained segment of a person's life, a place to grow up and "become a man" (or woman). There should be some sense of adventure, or at least of departure from life's routine.
2. ACAO should have certain properties of regular employment. Most important, enrollees should be paid. They should be able to meet people whom they might marry. They should be able to acquire a variety of career skills. However, ACAO should not be looked upon primarily as a school; the acquisition of skills should be a highly important byproduct, as in the Armed Forces.
3. ACAO should have certain properties of college. There should be some emphasis upon personal development, including late or recurrent socialization.[14] It is sometimes said, possibly with some exaggeration, that a major function of fraternities and sororities was to take farm boys and girls, and other graceless post-adolescents, and give them the manners and culture appropriate to college graduates. While much of this function has been given over to television, it is evident that that approach is incomplete.
4. There should be some time apart from work duties and from manual/physical effort for reading, lectures, discussion, et cetera. That is, it is our opinion that traditional book-learning and classroom learning mixes poorly with on-the-job and job-simulation learning.
5. ACAO should have certain properties of the Peace Corps. The idea of a National Service Corps has been suggested; we think a "do-good" option should be available, but the idea of national or international service, as opposed to self-development, should not be so strongly emphasized as to dominate the public image of the program. The program should be open to those who don't want to do good.
6. Though they would not be barred, the program would not be given the image of being designed especially to deal with the unemployed, with street people or postmakers, with juvenile delinquents, with dope addicts and ex-convicts, et cetera.
7. One idea worth examination is the establishment of 15 to 20 units, chartered by the Federal Government, but organized by other institutions operating on a modified voucher plan, in competition with each other.

C. EDUCATIONAL MANPOWER

The Federal Government has a variety of programs affecting educational manpower. But it is not clear that the Federal Government has an educational manpower policy.

The fact that there is a teacher surplus and that it follows upon the heels of a teacher shortage, suggest the need for a national educational manpower policy. The development of such a policy would require three-stage research, as follows:

1. A national inventory of the teacher force. It is possible without a survey or inventory to make some plausible inferences concerning the "teacher-force"—the aggregate of (i) certified teachers engaged

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[14] William M. Rivera, "Recurrent Socialization," Working Paper, Educational Policy Research Center, June 1971.

in teaching; (ii) certified teachers not engaged in teaching; (iii) uncertified teachers engaged in teaching; and (iv) uncertified persons who might, under some conditions (such as a temporary though severe teacher shortage), be drawn into teaching. A national inventory of educational skills would go further, and determine the distribution of these four groups among elementary and secondary teaching and among fields of competence; and the geographic distribution, at least to highlight areas, if any, of particular abundance and shortage.

Such an inventory would give the size of the "teacher force," the sum of the four, and of the "working teacher force," which is the sum of (i) and (iii). Changes in the teacher force would occur through the output of schools of educatioin and related educational outputs (increment), and through death and retirement (decrement). Changes in the working teacher force would occur through the same changes, together with movements of persons from (ii) to (i) and from (iv) to (iii).

Projections of the supply and demand for teachers would then include these four categories, and in cases of shortage would involve a consideration of whether and to what extent it could be dealt with by shifts among categories, rather than increasing the output of schools of education.

2. The second aspect of the policy research would be an inventory of policy instruments available to the U.S. Office of Education by which it can influence the size of the teacher force and of the working teacher force. An evaluation would be made of each such instrument. First is the ability to propose new legislation, particularly institutional and student aid in teacher preparation, and then, annually, the ability to seek funding for existing programs. Suffice it to say that this instrument is a crude and inflexible one, difficult to start, even more difficult to reverse. Second is the ability to influence, through leadership and moral suasion, chief state school officers and deans of schools of education. The USOE might put forth, for instance, a set of guidelines to advise schools of education on admissions policies consistent with equating the supply of teachers with the demand. Since such a program of leadership would not seem to require statutory authorization, it is included here among currently available instruments, though it is not in fact used.

3. The third step is to determine whether additional and/or modified instruments of educational manpower policy are needed, and who should make educational manpower policy and utilize these instruments—the Commissioner of Education, a regulatory body comprised of representatives of affected groups, or some other group. This question of institutional authority would be somewhat more sensitive should the new instruments include discretionary control over the amounts and distribution of institutional and/or student aid in teacher preparation, and financial inducements to former teachers to return to teaching, and so forth. Should the instruments of this manpower policy be limited to leadership and moral suasion, as indicated above, the institutional locus of this "power" would not be particularly controversial.

VI—SUMMARY

In brief, we conclude that at this time there appears to be no particular danger of a fundamental surplus in the output of B.A.'s in the

1970's. There does, however, appear to be reason to suspect an overproduction of Ph. D.'s. But this overproduction is small in terms of the size of the total work force and in terms of the margin of error in projecting supply and demand. Finally, it seems quite certain that we are about to enter a period of fundamental surplus of elementary and secondary school teachers. How rapidly individuals, schools of higher education, and State governments will respond to this imbalance remains problematic. An informed Federal policy directed at ameliorating this surplus would have to be based upon some knowledge of the strength and effectiveness of these non-Federal sources of adjustment of supply and demand.

In the course of this report we have made a number of remarks about manpower planning which may strike some as bordering on disparagement. This may to some extent reflect our own personal and subjective opinions.

Nonetheless, we feel that if a course of manpower planning is to be adopted, it should be done fully, deliberately, and well. Quick or piecemeal manpower planning should be avoided—there simply is too much room for error. Much more information than is currently available would be needed. This applies especially to the lack of disaggregated data for the various categories and disciplines of B.A.'s. teachers, and Ph. D.'s.

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HOW'RE YOU GOING TO KEEP THEM DOWN ON THE FARM AFTER THEY'VE SEEN TV?[1]

BY DR. ROBERT L. HILLIARD, CHIEF, EDUCATIONAL BROADCASTING BRANCH, FEDERAL COMMUNICATIONS COMMISSION CHAIRMAN, FEDERAL INTERAGENCY MEDIA COMMITTEE

It seems to me we are wasting our time.

We talk about early learning centers. The early learning center is the 4 square feet in front of the television set.

We talk about case histories. The case history is that by the time the child enters kindergarten he or she has already spent more hours learning about the world in front of the television set than the hours he will spend in a college classroom getting a bachelor's and master's degree.

The child, at any age, no longer enters the iron suit of formal education—if he ever did—as a blank piece of paper to be written on by a teacher.

The college student of today is of the television generation. He has seen war, assassinations, and the moon. Does anyone really think they're going to teach him history out of a book?

I have had the privilege of speaking at these conferences for 5 years now. Each succeeding year I have more and more cause to wonder whether all conferences are merely sops for consciences, that make procrastinators of us all.

Four years ago I spoke about television and early childhood education. I urged full and careful utilization of this medium that children at the earliest age are most tuned in to, as the primary means for motivating and educating children. So here I am, 4 years later, invited back to speak about the same thing. Sad to say, I could give exactly the same speech again because although the realization and urgency have grown, there is still virtually no meaningful action on the part of educators and industry to meet the real needs of the children and of society through television.

Talk about a generation gap. What a tragic waste of time, what a revealing picture of why some of the brightest, most capable students are dropping out, turning on, or burning down, for us to talk here about early childhood education, about any education and not realize where its really at. Its right there in the living room, and until you know that you are completely out of what's happening in this world today.

It has taken a 10-week education and communications lecture-consulting-study tour of Asia and the Soviet Union, from which I have just recently returned, to clear away any reservations I may have had on the failures and successes, the inadequacies and potentials of education and communications in this country and throughout the world.

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[1] From an address to the American Management Association, Sixth Annual Conference on Education and Training, New York, Aug. 3, 1970.

Those of you who have traveled in Asia know that you don't truly begin to understand what educational communications means to this world until you go through the streets of Calcutta and see that it is only the very lucky ones of the more than half-million people who are born, exist and die on the streets who have a sewer pipe to crawl into at night.

Only after your insides and heart and head are torn apart by the bestial poverty virtually everyplace you turn in southeast Asia, after you witness the daily bloody revolutions of individuals and groups who have nothing to lose by dying because a bullet or a bayonet is less painful than their slow diseased starvation, can you really understand how tragically serious is the seemingly flip comment, how're you going to keep them down on the farm after they've seen TV?

In our supersophistication of economic security (man, the times-are-a-changin'!) we still, every day, conduct our educational institutions as if sitting on one's rear end within the confines of four walls for 3 hours a week for 15 weeks had anything to do with learning. (Pity the poor elementary and secondary school child, who is trapped for 5 hours every day in such a situation. I suppose there are just three places in our society where human beings are held irrevocably against their will: Jails, insane asylums and schools).

The tragedy is that even after the classroom gets burned down most administrators and teachers still don't get the hint and they make speeches and testify before congressional committees placing the blame on virtually everyone and everything, but forgetting to include the most compelling factors of all—the inadequate educational techniques and systems. I am not discounting the public issues raised by the students. I do say, however, that the root cause of the problem is the educational system and practice which force students to go out of the school if they want to deal with the critical issues of society. (I will tell you later about a new university that could be the salvation of American education—its whole orientation is practical concern and action in regard to the critical needs of the day which will focus the students energies on positive communications projects to solve the problems.)

Blame it on television. Our students today are not going to stay down on the figurative farm. They have grown up with television, spending about 50 percent more time in front of the television set than in the classroom by the time they graduate from high school. They have seen the realities of the outside world and they are not willing to accept the insular, isolationist, esoteric irrelevance rampant in formal education as those of us did who didn't have the advantage of TV to know any better.

Despite the potential incitement of TV to progress and change—not welcomed in every country in the world—everywhere I went in Asia; in Japan, Hong Kong, Taiwan, Thailand, Cambodia, Burma, Nepal, India, Pakistan, and in Asian and European Republics of the Soviet Union, I got the same message from almost all government officials, educators, parents, children, professionals, blue collar workers and, especially, from business and industry executives.

And the message was, simply and directly, that they want communications and need communications to create a contributing, viable population in a world that has closed in on and made every country an integrated part of that world.

Even in countries where there is in part or in whole political isolationism, businessmen told me privately that they hoped television could be developed as an effective link to other countries and eventually provide an understanding and opening for increased trade. Even in countries where official announcements have proclaimed no immediate interest in educational television, industry executives have told me of their efforts to promote ETV in order to provide bases for greater liaison with other countries through program exchange and cooperative program production. Even in the poorest countries the gleam of a communications future includes computers, lasers and even holography.

And where does it start? It all starts with the children. For the children on the streets and in the jungles and on the deserts and on the canals who will grow up in a society unchanged from that of their parents and grandparents and great-grandparents because they don't know what is possible or probable in the world beyond their immediate world. The children in the cities and villages who are dying of disease and starvation in front of our eyes because their parents either do not know what is possible for them or who do not have the education or training to do more than they are doing. The children who will not live beyond infancy or if they do will not contribute to but drain from society as mentally or physically deformed victims of their environment, because their entire village or city or region has hardly even fleeting glimpses of anything but their own dark-ages existence.

How do we reach the children? With a little love, to start. Enough love to be willing to give up some of cherished status quos. In education. In school financing. In industry-school relationships. In educational philosophy, method and technique. In the use of communications. In all those ways that have continued to keep millions of children throughout the world with distended bellies and shriveled brains. By being willing to educate ourselves, the adults, to use communications not only to train more efficient workers, not only to provide quality entertainment, not only to sell products, but to use communications in terms of its most critical potential: To directly solve social, economic and political problems of mankind.

Last year, at this conference, I briefly mentioned the International University of Communications, which has been chartered in Washington, D.C., as the first institution to educate beginners and professionals on the graduate level to use communications to meet critical human needs. Project-oriented learning, combining multimedia learning carrels and the tutorial approach, with objective research and practical implementation of projects to demonstrate knowledge and competence. No classes, courses, curriculum, examinations or lectures which are irrelevant to practical learning and inapplicable to the real demands of society. (How many of you hire someone for middle management on the basis of how many questions they get right on a true-false and information-completion exam? See how ludicrous it sounds! And yet virtually every school uses information testing as a basis for evaluating a student's ability.)

The International University of Communications will be the first university to provide personnel and services to meet any need of any organization in the communications industry, as well as providing similar direct practical services to every other profession and business in the world, based on the concept that successful communications is an essential part of any successful operation in any field of endeavor. This university has received enthusiastic support all over Asia and Europe. A branch has already been set up in Japan, and the Japanese communications industry is contributing to the development of the university. They see this university as the only educational institution whose goals and products will directly contribute to the growth and success of the communications industry. And what's wrong, at long last, with a quid pro quo between industry and education? Special national advisory boards for the university, in addition to its existing international board, are being set up in a number of countries. If I am enthusiastic about this university, it is because it is the first and only opportunity we have had to demonstrate not only the real use and impact of communications in education, but to educate people to use communications in a direct, practical way to solve concrete problems in many areas. It may be our first truly effective opportunity to provide the resources and personnel to reach the child in a way the child has to be reached.

One of the things we have in common with Japan is a love for statistics. I found great interest in the charts and graphs I used in my lectures in Japan. I have not directed myself to statistics here today. Not for Sesame Street. Or Wilbur Schramm's research. Or Hagerstown. Or examples in learning on the part of my children. Or my neighbor's children. Or Ford Foundation research on the use of television in the schools. First of all, you have heard them many times. If we still have to prove to ourselves that television works in education, then we have learned nothing in the last 20 years. Except for the PTA chairman of educational research who knows somebody in South Junction whose children didn't like television in their school and therefore it is of no value, there should be no question that television can provide learning experiences for the child not otherwise available. And that refers to television incorrectly and inadequately used—as it is now used throughout the United States, as reinforcement to the classroom. Reinforcement of outdated, outmoded, 19th century education. Imagine how magnificent television could be, if correctly used, to capitalize on the visual set for learning of all children, on the medium orientation of some 4,000 television hours that children take into the first grade formal learning situation with them, on the visual real-life motivating factor. This is one of the purposes of the International University of Communications, incidentally—to help people learn to apply television in terms of its and the child's real potential.

In this regard it is interesting to note that teacher-training institutions in the Soviet Union require at least 6 months of education in the use of technology, including television, in the school. Yet, not a single State in the United States requires any education in the use of instructional television for teacher certification. Use that tidbit next time some superintendent of education wonders why the kids aren't learning or tries to tell you that his school system is part of the 20th century.

For those people who feel they haven't had their money's worth without a bunch of numbers and dotted lines, I have attached to copies of this presentation, which are being distributed by AMA, an appendix with some data and a copy of my paper of 4 years ago on the same subject. But even as this extra material was being put together, I couldn't help but think of the group of black children in one of the elementary schools in New York whose IQ scores went up 20 points shortly after they began getting hot breakfasts before school every morning, where they previously had had nothing to eat before school at all. That indicates how valuable standardized tests are as a measure of ability.

When I talk about the children of Asia, I do not leave out the children of America: and when I talk about the children of America, I include the children of Asia. The revolutions of energy, transportation, and communications have made all children necessarily interdependent. It is a practice in some places in Asia—and in America, for that matter—to close one's eyes to existence. Virtually everyone I saw with decent clothes on their backs and a roof to go under and food to eat seemed to walk the streets of Calcutta and other cities pretending that what is in front of them doesn't exist. It is like the people at the bus stop in Eugene O'Neill's "The Hairy Ape," oblivious to a frantic Yank trying to penetrate and bouncing off their closed society.

When are we going to stop walking down the streets of the Calcutta's of the world, as if death and degradation are not there? How effectively can we learn about and solve the problems of our society by sitting and talking to each other in plush air-conditioned hotels? We came to find out about education and training. Don't we care who needs that education, what kind of education they want, what problems that education is going to solve?

We ought to get up off our own rear ends in the ivory towered four-walled teacher-and-blackboard-lecture classrooms—whether we call them schools or offices or conference halls. If we are really concerned with the children, we ought to get out to where they are and see how inadequate and literally destructive the present systems of education are for them in the elementary, secondary, and higher levels. We ought to get out of here and onto the subway and go look at P.S. 118 in Bay Ridge, and Dewey Junior High School in Sunset-Red Hook, and Boys High School in Bedford-Stuyvesant. And they aren't the worst ones. They just happen to be the ones where I went to school.

And you don't even have to do something so dramatic as taking a subway to Brooklyn. What about your own communities? Are you part of the scene?

I mean, are you trying to actively better society or do you retreat to the inner sanctuaries of your barbecue pits and swimming pools of suburbia and shut out the outside world from your suburbia-family cocktail parties?

What is interesting is that these suburban pillars usually complain the loudest about hippie copouts who retreat to the inner sanctuaries of their railroad flats of urbania and shut out the outside world from their hippie-family pot parties. What hypocritical gall. The primary difference between the suburban and urban copouts is the length of their hair.

If we are willing to acknowledge that the streets of the Calcuttas and Bedford-Stuyvesants do exist, then we have no business wasting our time discussing such inane questions as will television be of value and should we use it. We have no choice.

Television is—must be—a critical factor today in changing education. And you, the businessman, are and must be another critical factor. If we assume that one of the stereotypes about business is true—that you are pragmatic, practical men and women—then you know something must be done and done quickly. There is a generation gap between the child and the school administrator. The student does not trust the bureaucratic, curriculum-oriented establishment. But there is no generation gap between you and the educational establishment. You have the knowledge, the ability, and the prestige, locally and nationally, to insure a responsive bureaucracy in our educational system; to use your communications abilities to see that education uses communications to meet the needs of the child and of society.

We have let cities burn because we were unwilling to use communications to meet inner-city needs.

We allow countries to murder each other because we are not using communications to bring understanding to people of other people's needs and desires.

We permit pollution to stink through too many endeavors and professions because we do not uncover them with the fresh light of communications.

And we are allowing our children to be manipulated and tested and standardized and robotized and shut out from meaningful, free-choice, relevant, life-oriented learning because we still permit education to function as if television and communications were peripheral.

Let me state categorically my message for this year:

Students are bringing down our educational system because it is outmoded and irrelevant, because it is oriented to teaching and not learning, because it uses 19th-century methods of communication when students are part of 20th-century communications, and because it remains largely unresponsive to the needs and cries of those who it is supposed to serve.

Teachers and educational administrators are bringing down our educational system because they continue to pretend that education takes place in a classroom from a teacher, and they do not recognize either the degree to which education has already taken place and is taking place through television, or that education is a process of learning, not teaching.

You, more than any other group of individuals, can change that.

The most important task during the next 12 months, before we meet again for intellectual back-patting, is to reorganize as completely as possible the American educational system, using communications, particularly television, as a base for reaching, turning on and tuning in our youth, in the home and in the outside artificially imposed learning center. (I deliberately avoid that outmoded term, classroom.) At the same time we must begin to provide the kind of education needed by all segments of society to be able to use communications to meet the critical social, political and economic problems of mankind.

This summer I have in my office in Washington an intern. One of thousands of people from all over the country who are learning about the operations of the Federal Government and, hopefully, from whom we bureaucrats are learning. This man looked at a draft of this paper and wrote some notes on it. I want to quote him.

"I liked it, but I fear that we hear these calls so often that they tend to be merely accepted and largely ignored. But, I hope, if calls are made often enough there may be an eventual impact. Hope there is time."

I hope there is time, too. That is entirely up to each of you.

If we are willing to devote time, energy, conviction and money to this now—today—this moment, then maybe a few years from now we won't have to pretend that the Calcuttas of the world do not exist in front of our very eyes.

APPENDIX

Television may serve as a device for early childhood education in the home and in a structured classroom situation. Woefully inadequate data have been compiled on the impact of television as an educational factor in either of these roles. J. Reid Christopher and Donald W. MacLennan cite a study, for example, in which some 250 comparisons between televised instruction and direct instruction were carefully examined.[1] Of the 250 comparisons, 217 were considered uninterpretable, 23 partially interpretable, and only 10 studies were considered interpretable. From these 10 studies the authors concluded that there was no significant difference between televised and direct instruction.

Extensive analysis is currently being conducted on data collected by Children's Television Workshop and Educational Testing Service. These data, concerning the impact of the program Sesame Street, should constitute the first significant survey of the impact of television as an educational device in the home setting.

Some observations concerning the role of television in the home are in order at this time even though the impact cannot be statistically measured. There are about 24 million preschool age children not in school.[2] Only some 250,000 are enrolled in Headstart and fewer than 50,000 in programs under title I of the Elementary and Secondary Education Act on a full year basis. A vast majority of preschool children have no access to organized educational opportunities. Nearly all of these children do, however, have access to television.[3] Thus there is an opportunity for television to serve a functional role in early childhood education.

TELEVISION IN THE CLASSROOM

Godwin Chu and Wilbur Schramm's significant analysis of the research which has been conducted on television as a clasroom educational device includes a review of the Hagerstown, Md., junior high school study.[4] Tables 4 and 5 of that study are included here.[5] The indication is rather clear that television did contribute to educational achievement.

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[1] Reid, J. Christopher, and Donald W. MacLennan. "Research in Instructional Television and Film." Washington: Department of Health, Education, and Welfare, 1967, p. 4. The study cited is: D. W. Stickell, "A Critical Review of the Methodology and Results of Research Comparing Televised and Face-to-Face Instruction." Doctoral dissertation, the Pennsylvania State University, June 1963.

[2] Mukerji, Rose. "Television Guidelines for Early Childhood Education." Bloomington, Ind.: National Instructional Television, 1969, p. 8.

[3] Dr. Edward L. Palmer estimates that television is in 90 percent of homes with incomes under $5,000. See his article, Can Television Really Teach? "American Education," August–September, 1969, p. 6.

[4] Chu, Godwin C., and Wilbur Schramm. "Learning From Television: What the Research Says." Washington: National Association of Educational Broadcasters, 1967, pp. 2–3.

[5] Ibid.

TABLE 4.—EFFECTS OF TELEVISED LEARNING

	Grade 3	Grade 4	Grade 5	Grade 6
National norm in May	3.90	4.90	5.90	6.90
1958 (before TV)	3.59	4.43	5.26	6.49
1959 (1st year of TV)	4.06	4.97	5.77	6.83
1960	4.18	5.01	6.13	7.17
1961	4.30	5.08	6.19	7.28

TABLE 5.—COMPARISON OF GROWTH WITH PUPILS TAUGHT CONVENTIONALLY AND BY TELEVISION

Ability level (grade 6 science)	Taught conventionally		Taught by TV	
	Average I.Q.	Achievement growth (months)	Average I.Q.	Achievement growth (months)
111-140	117	12	118	15
90-110	100	12	100	14
57-89	83	6	83	13

Other studies are cited by Chu and Schramm which indicate that there is no significant difference between learning from television and conventional methods.[6] However, though a large majority of the children show no significant difference, there are more who show significant improvement in learning through television than those who do better under conventional methods.[7] The authors contend that the data indicate that there are a number of cases in which televised instruction has brought about more learning than the existing level of classroom teaching.[8]

Consideration of these statistics should be tempered with the realization that there is serious question as to whether television has been used at all effectively, and to what degree it can be successful even with good program materials when very few teachers using it have adequate training for its effective utilization.

TEACHER TRAINING IN THE UTILIZATION OF CLASSROOM TELEVISION

Although coursework in the utilization of television in the classroom is required by many colleges and universities (see table 31), Robert E. and Melissa H. de Kieffer found that in 1967 there were apparently no States which required instructional media courses for certification.[9] In 1947 two States (California and Pennsylvania) had such a requirement. They were joined by 1957 by Maine and Florida. By 1967, however, no States indicated such a requirement. The authors observe that "when asked if such certification was contemplated in the near future, 13, or 26 percent, of the State departments answered affirmatively." [10]

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[6] The authors summarize the findings of the following: Schramm: "Learning From Instructional Television," "Review of Educational Research," 1962, 32, pp. 156–167. Pflieger, E. F. and F. C. Kelly. "The National Program in the Use of Television in the Public Schools." New York: The Ford Foundation and the Fund for the Advancement of Education, 1961. Kelley, C. F. "The Efficacy of Television in the Schools," "Dissertation Abstracts," 1964, 24, p. 224.

[7] Chu and Schramm, p. 5.

[8] Ibid. p. 6.

[9] de Kieffer, Robert E., and Melissa H. de Kieffer. "Media Milestones in Teacher Training." Washington: Educational Media Council, 1970, p. 16.

[10] Ibid.

TABLE 31.—NUMBERS OF MEDIA COURSES REQUIRED OR ELECTIVE IN 4-YEAR INSTITUTIONS

Type	Required	Elective
Academic year	150	399
Summer school	87	321
Extension classes	15	49
Total	252	769

[1] Ibid., p. 45.

A survey of such requirements is currently being conducted by Dr. William F. Grady of the Educational Media Center of Temple University. Dr. Grady has found no State requirements of television training as a requirement for certification nor has he found indications that such requirements will be instituted.

Some State departments do have requirements for those who administer educational media programs. The de Kieffer study includes table 9 which is reproduced below.[12]

TABLE 9.—NUMBER OF STATE DEPARTMENTS REQUIRING COURSES IN EDUCATIONAL MEDIA FOR CERTIFICATION OF THOSE WHO ADMINISTER EDUCATIONAL MEDIA PROGRAMS IN THE SCHOOLS

Certification	Number of departments	Range of semester hours required	Mean number of of hours
1. Administrator	2	6-12	9.0
2. Supervisor	4	6-12	9.0
3. Librarian	6	2-12	5.2
4. Educational media director (full time)	10	0-24	8.4
5. Educational media director (part time)	6	0-12	4.5
6. Educational media building coordinator	7	0-12	4.4

Note. Appendix prepared by Lyle A. Green, Washington summer intern in Educational Broadcasting Branch, Federal Communications Commission.

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[12] Ibid., p. 17.

"TELEVISION AND CHILDHOOD EDUCATION"

BY DR. ROBERT L. HILLIARD

As the rumblings of revolution in education—in the school and outside of it—grow louder and louder, one discordant note continues to detract from the swelling rhythm of development. On one side the so-called scientists and engineers, and on the other the professed philosophers and educators. And the controversy—in which you are all involved—is whether the tail is wagging the dog, or, in more appropriate modern terms, whether we are going to the moon for a purpose or is it an end in itself.

What is the relationship of content to media? Have we lost sight of what we are saying, in our efforts to find better and better ways of saying it? Is—how shall we put it?—the medium the message? (No, that's a slogan that surely could never catch on. Let's try another.) The conveyor is the content.

Some people would be surprised at such a statement. Such a statement would seem to many to be startling, perhaps revolutionary, and in the broadcasting field—maybe even controversial. Some people are surprised to hear statements that the mass media are more than means of transmission, that in themselves they can affect thought and feeling. What surprise greets allegations that electronic communications have a profound effect as substance as well as process!

The surprise to me is that there is surprise. Why, we have known that this was so ever since the first human uttered the first sound or danced the first dance or painted the first picture on the wall of a cave to communicate something to another human.

Hasn't music always been communicated in just this manner? Isn't the medium of music also the meaning?

Only two decades ago Picasso wrote a monograph on the time-space concept, in which he showed how, through the development of new media of transportation and communication, we no longer see the world and its objects through a limited, fixed, single-plane viewpoint, but we can see it from many viewpoints and from many sides virtually at once. A simple, obvious statement that not only explains Picasso's art, but also clearly shows how the medium itself becomes an affective, content force.

Of course, the conveyor is the content, the medium is the message, just as the automobile is the message. Over and beyond its use to transport us places, the automobile, in itself, has changed our cultural patterns and personal and public behavior and development, as individuals and as a group.

Television coverage of Birmingham, Oxford, and Selma did probably more than anything else to effect the passage of Federal civil rights legislation. Even those people afflicted with the sickness of racial prejudice could no longer ignore what was going on about them, and had to be ashamed, or at least concerned, with what they saw.

Content, yes, but the medium itself created an effect aside and beyond the content. A riot in the street has one effect; it has far greater effect happening right in your own living room.

This is not to say that the medium replaces the content of the message. It adds to it, it provides complementary and supplementary—and even seemingly unrelated—stimuli which make the content—the purpose in using the medium in the first place—more effective, and clear. And in addition, it carries with it its own role of affectivity.

Recently I was reading a review of a new edition of John Dewey's "Lectures in the Philosophy of Education," originally written in 1899. The review stated that Dewey's philosophy of education "has only a limited relevance to the problems in our schools and colleges that perplex us most." The implication, as I understand it, was that Dewey's stress on the socialization of the child—that is, the education that could put the child into an effective relationship with and control over his environment—was not entirely desirable or successful, as related to the potentials and needs in education. Unfortuately, the reviewer seems to be further away from the realities of education today than Dewey was 70 years ago. What are the desirable goals of education today? Combining the instrumentalist, rationalist and electicist philosophies, education's goals are, briefly, fourfold; to educate the student to achieve effective participation as a citizen in the affairs of the world; to achieve self-realization; to acquire some degree of vocational efficiency; and to attain ethical and esthetic growth.

Dewey could not do this, 70 years ago or even 30 years ago, except in a partial and limited way. Very simply, he could not take every student in every classroom into every corner of the outside world; and he obviously could not bring the world into the classroom. I don't have to tell you that we are doing precisely that today in every classroom where the modern media of communication are present and are being used. The media themselves, affecting the very manner in which one responds and learns, constitute an additional message.

For example, let us look for a moment at the teacher-pupil relationship. We frequently find teachers and administrators who are afraid of television. I know of a board of education audio-visual director of one of our country's 10 largest cities who refuses to develop or use television in instruction. He states that he has never seen anything good on ETV and that ETV has not demonstrated any value at all for education. In his already established neanderthal educational philosophy, he would hardly accept the concept of the conveyor being the content. He would be horrified at the notion—which has been indicated through objective research—that TV provides a greater, more effective 1-to-1 relationship than does the traditional in-classroom situation. In the latter the teacher can make a 1-to-1 contact with one person at a time. Through television this relationship is with all the students all the time. The medium is, here, clearly the message.

But I don't want to talk to you today about this. Let's not belabor that subject. It is such an obvious truism that I am amazed and disturbed that so much of our energies recently have been taken up discussing as controversial or new, something that we have known since communication first began and that is so simple that to make an issue of it borders on the ludicrous.

With the media's great advantages, there is also great danger. Mussolini once stated that without radio he would not have been able to achieve the control over the Italian people that he did. The question that we face, then, is what do we do about the control and proper utilization of the media so that we maximize its advantages and minimize its dangers?

In this regard I take strong issue with those who stress content, and with those who stress the medium, and also with those who stress an interdevelopment and use of both. The purposes of means and content is to educate the human being, to affect the thoughts, emotions and perhaps even actions of the human being. We consistently tend to lose sight of the fact that the most important factor, the raison d'être for all of our efforts and machines and philosophies is this individual person, to whose needs all of our work and decisions should and must be oriented.

And the specific question, then, that I ask you here today, as directly, as I can, is what do we intend to do about it in relation to our children. We are a child-oriented society—and yet those things that our children do most—such as watching television—we do the least about.

If its potential is to be used, indeed, for the advancement of human society, then, most of all, television belongs to our children. Television's primary efforts should be oriented today toward fulfilling the needs of our children in our attempt to educate them to be the kinds of citizens we want them to be tomorrow, to be the kinds of individuals in their own personal orientations toward life and ideas that we hope they will be tomorrow, to be the kinds of people who can achieve and maintain an ever-peaceful, prosperous world for all of humanity—the kinds of people we laud, that we ourselves clearly are not, and that we hope the new generation can somehow become.

Do we really believe this? If we do, then in our private sector of the home, for example, where we presumably can take actions in which we believe, we would never—never—allow a child to sit at a television set without a trustworthy interpreter.

For the child, the television set is something of vast power. What else takes him into the world, what else brings the world—its experiences, thoughts, events, things, ideas, feelings—right to him.

About a year and a half ago, a then 4-year-old of my acquaintance was busily pasting strips of cellophane tape across the dials of the television set in his home. When he had finished, he stepped back, looked at what he had done, and in a matter-of-fact confident voice, pleased with himself, he announced: "Now I control the world."

And he did.

The same child, now five and a half, was recently talking with a friend of his—the same age—about boats.

"You know what an anchor is?" he asked.

"Yes," his friend answered. "It's to hold a ship in place when they don't want it to go. My daddy told me about it."

"My Daddy didn't tell me about it," my young acquaintance said. "He didn't have to. I saw it."

The medium changes not only the content, but the entire behavior and learning and growth patterns of our children. The child entering school who has watched TV—even nonselectively—is much better informed, all other things being equal—than the child who hasn't watched TV. But information is the least important of it. More important is the child's special awareness of visual observation and learning, his abilities to relate nonimmediate, mediated experiences to live experiences and to print description, his openness to the utilization of media for learning development as well as being able to sit—maybe rightfully impatiently and uncomfortably—at the other end of the educational log.

But that all these things are possible, are probable, are actually happening, isn't enough. Because we have grown half a bough where none was before is no excuse for letting the child hang there in mid-air in the cradle, waiting for the bough to break and hoping that it won't.

The parents and mass media practitioners and educators—and surely every person here falls into at least one of these categories—must all assume some responsibility for the child in relation to television.

We too often forget that the imaginations of children are broad, exciting, stimulating. It is only when we approach adulthood that we begin to conform, to restrict our minds and thoughts and feelings, to dry up that most precious of creative potentials, to base educational progress on such irrelevant things as information examinations and IQ tests.

Because children's imaginations are so sharp, they are sometimes more critical than adults. It is true they can release themselves to be led into almost any fantasy, but—unless they are psychologically disturbed—there has to be a valid believable base to begin with.

Many so-called children's shows attempt to capture the interest of parents and other assorted adults. This is fine, if it is not done for an ulterior reason. Indeed, in some cases the term "children's program" is a misnomer because many of these supposedly bioriented shows are really aimed at adults almost exclusively. If you watch the programs your children watch, and find them dull and tasteless, then quite likely that program is not going to enrich your child's day, develop his taste or be worth his time. One must differentiate between audience ratings and value. The child may "love" the program. But that is not the only criterion of its value, entertainment-wise or otherwise. The child may "love" candy, too—but a responsible parent (and, we hope, responsible public relations director, agency account executive, company vice-president, producer, director or writer) will not allow him to subsist on it all his waking hours.

Grace Stanistreet, one of the country's leading teachers of creative arts for children, has written about some of the responsibilities of children's threatre that may be applied just as validly to television:

"Many people with the responsibility of selecting programs for the young, watch the child at a children's play and take his reaction to it as the best recommendation. Would they take a child's word about what to include in the week's menus? Or what the family should wear, or when they should go to the dentist? But these things are fundamental to good living, they may protest. Is theatre (or television) different? Isn't exposure to cultural experience fundamental to good living?

"A child has no standards for judgment and evaluation. He is in the process of acquiring good habits, appetites, tastes, standards, by association, example, influence. The wise parent knows the part he must play in developing these in his child.

"He must select the exposures, the images, the experiences out of his greater knowledge of the child's needs and what will serve these needs. He does not impose his will, desires, purpose, taste but refers and defers at times to the child's purpose, desires and abilities. He makes decisions based on both, not solely on one or the other."

During the Federal Communications Commission's hearings on television in the fall of 1961, Melvin Helitzer, the advertising director of a toy manufacturer that spends 90 percent of its advertising budget on television, stated that one of the reasons for the failure of some shows written for children was that "the intelligence level of the writing was below that of the children." He said that "children are more intelligent than most adults believe," and that a program produced by people "who have no respect for children" was doomed to failure.

And we should add that those who have no respect for the fact that the television medium itself is content and in itself is having a profound effect on children, are dooming the children to failure.

We—virtually all of us here—are too old to have known television in our formative youth. Television arrived at an age—our age—when we were not quite so susceptible to its molding, although I think we must admit that as a medium it has affected us, too, to a great degree.

But because its greatest impact is on youth, and because our future depends on our children, I repeat that television is and should be for children. We must make certain that it provides the kind of content—as conveyor and as content—that the child needs. For example, at the rate at which knowledge is growing, by the time the child born today graduates from college, the amount of knowledge in the world will be four times as great. By the time that same child is 50 years old, it will be 32 times as great, and 97 percent of everything known in the world will have been learned since the time he was born.

Methods of teaching and learning as we now know them will be of dubious value. The entire concept of education must be changed, perhaps in a series of educational revolutions going far beyond the revolution from ancient to modern means that most of us like to believe is happening today. Not only must educational technology be properly used to make the student aware of and perhaps even understand some of the new knowledge of the world, but the media—their form, their use, their composition—must be used so that their existence as content, as message is most effective.

Our responsibility is twofold: first, to clearly recognize that the medium is the message, that the conveyor is the content in that the media in and of themselves have a profound effect on emotional, thought and behavior patterns, and that we must accordingly design and utilize these media with that in mind, making them and their use optimum in terms of our purposes of education. Second, to know that the most important factor in human progress—indeed, in survival—is the child, and that it is our children who stand to gain most—or to be harmed most—by the way in which our media are used and that, in this context, television, all educational technology, belong to our children.

Most audiences, no matter how strongly exhorted, are not in a position to accomplish anything directly. Usually they must go through a Congress or a school board or a group of stockholders. But here we do have people who are, in fact, in a position to make concrete and vast changes in the future of education if they so desire. And that is why I wish to impress upon you that educational media are perhaps even more important than you may think they are, that the medium is content for the child, and, most importantly, for those who are in position to do something about it, the corollary: the message is—the medium.

THE WORLD AFTER PLATO IV: THE IMPLICATIONS OF COMPUTER-BASED SYSTEMS ON EDUCATION OF THE FUTURE

BY DANIEL ALPERT AND DONALD L. BITZER

IMPLEMENTATION OF THE PLATO IV DEMONSTRATION EXPERIMENT

After a decade of research, invention, and development, the PLATO program at the University of Illinois is about to initiate a major demonstration test and evaluation of a large computer-based education system. The experiment will be aimed at the continued evaluation of the educational effectiveness and the economic feasibility of this new medium. As described in an earlier paper entitled "Advances in Computer-based Education" (appendix I), the design of the PLATO IV system is aimed at providing an extremely flexible instructional capability for a target cost of 35 cents per student-contact hour. This system is the fourth in a series of increasingly versatile and sophisticated systems devoted to exploring educational possibilities and testing the effectiveness of this new medium at all educational levels and in more than 30 disciplines.[1] A single fully implemented PLATO IV system will be capable of serving several thousand student consoles distributed in a wide variety of educational institutions and over a large geographic area.

The implementation of the first PLATO IV system is underway with approximately 250 student consoles to be installed by mid-1972 and at least 500 consoles to be completed by the following year. While the exact time schedule for the completion of a full complement of 4,000 student consoles has not as yet been finalized, we fully expect the entire system to be operational in the midseventies to late seventies.

One key feature of this system is that even in its initial phase we envisage a PLATO IV network, with the central computer, located in Urbana, reaching out by low-cost communication channels to other educational institutions within a 150-mile radius. Plans for cooperative programs have been established with at least seven colleges and many departments of the University of Illinois. In addition, similar plans are well underway with community colleges and with public schools in Chicago and Champaign. Strong motivation to be included in the PLATO IV network has been expressed by institutions in other States from Indiana to New York.

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[1] See, for example:

(a) Bitzer, D. L., R. Blomme, B. Sherwood, and P. Tenczar, The PLATO System and Science Education, CERL Report X–17. (1970)

(b) Bitzer, Maryann D., and Martha C. Boudreaux, Using a Computer To Teach Nursing, Nursing Forum, VIII (3). (1969).

(c) Lyman, E. R., A Descriptive List of PLATO Programs, 1960–70, CERL Report X–2 (revised). (1970)

(d) Myers, M. K., and J. B. Gilpin, PLATO: The Teacher's Mirror, Dialogues With a Computer, New York State Federation of Foreign Language Teachers Bulletin, 21 (3). (April 1970)

(e) Scanlan, R., Computer-Assisted Instruction in the Humanities, Illinois Journal of Education, 33–36 (February 1970).

(f) Smith, Stanley G., The Use of Computers in the Teaching of Organic Chemistry, Journal of Chemical Education, 47, 608. (September 1970)

A second key feature of the system is that each educational institution will have control over its own curriculum, will decide upon the use of PLATO IV in testing and evaluation of student performance, will control the handling of student records, and will establish the instructional setting for PLATO. Since each student console at any location can also function as an authoring console, it will be possible for each instructor to write, edit, or modify lesson materials from his own classroom, office, or laboratory.

A third key feature of the PLATO IV demonstration system is that it allows separation of the management of the computer center and the publication of lesson materials from the management of the educational program or the writing of instructional materials. It is therefore possible for the computer center management function to be carried out in a separate setting, permitting each educational administrative unit to control and manage its own educational program.

The costs of operation of the initial PLATO IV system will be higher than our target costs because the partially implemented system will not fully utilize the central computer, and the student consoles will be assembled from components initially manufactured in pilot production quantities. Nevertheless, the estimated costs even at this prototype stage will be less than $1.50 per hour and are expected to decrease sharply as additional consoles are added to the system. If the above objective is met in the initial system, it seems assured that the target cost of 35 cents per student-contact hour can be met by the midseventies to late seventies. As of the date of this writing, June 1971, the implementation of PLATO IV is proceeding on schedule.

EDUCATIONAL CHALLENGES AND ECONOMIC ISSUES

At all levels, educational institutions, both public and private, in America today face problems of crisis proportions. On the one hand, we face soaring costs and decreasing productivity. At the same time it is increasingly evident that institutions using existing methods are not capable of satisfying the diverse educational needs of our population. At elementary and secondary levels, a shocking fraction of our pupils (especially from inner city schools) emerge as functional illiterates or otherwise ill-prepared to assume a constructive role in our society. Community colleges suffer from serious inadequacies of qualified instructors and from stringent financial constraints which limit the range of instructional programs to a far narrower spectrum than is actually needed. At universities, there are persistent demands for reducing class size, increasing the number of small group seminars, tailoring individual degree programs for each student, and providing more options not limited to a single discipline or field of study. Finally, we have not as a Nation addressed the widespread and growing need for continuing adult education.

Thus, although the specific unmet needs and economic problems are different in public schools, community colleges, and universities, there are certain common features which characterize the problems of all of these educational institutions:

1. They are called upon to educate individuals of increasingly diverse background, preparation, and motivation.
2. They are faced with demands to expand their options and improve their performance.
3. They are handicapped by the imposition of hard limitations on overall financial support from tax-based or private sources.

Moreover, institutions of education at all levels must deal with the lack of motivation on the part of a large and growing segment of our student population to acquire the subject matter or skills which are said to be a prerequisite for the greater understanding which is to follow.

Unfortunately, the conventional institutional structure has many built-in limitations which block the fulfillment of unmet needs and which greatly impair productivity. In the classroom, upon which we depend heavily especially in primary and secondary schools, the quality of a teacher's understanding and the demands on him to maintain order impose serious limitations on what his students can achieve. At all levels of education, subject matter is usually broken down into "logical" steps which represent better the instructor's way of teaching than a student's way of learning. The class marches through these steps at a set pace, with resulting boredom or bewilderment for part of the class and a general underdevelopment of learning skills for the rest. Moreover, the learner stops being taught not when he has acquired the desired skill or set of concepts but rather at an arbitrary cutoff point in time: The end of the period, the end of the school year, the date of the final exam. In addition, even the most ambitious teacher is forced to address the average student—a being who exists only in the realm of concept—make assumptions as to an average cultural inheritance, and proceed at an average pace. The classroom, moreover, frequently becomes the locale for the public exposure of individual limitations. Far too often, pupils with less preparation are seriously discouraged when thrust into competition with more advanced students in this environment. The "standard" solution to these kinds of problems is smaller class size, resulting in significantly higher costs.

The new technological medium of computer-based education (PLATO) offers the possibility of an economically viable solution to many of these key problems.

1. Diverse background, preparation, and motivation of students. Since instruction with PLATO is highly individualized, students with wide variations in background, learning capability, and motivation can be accommodated. While following the same central development, slow students can be given as much additional help as needed and proceed at a pace commensurate with their skills and abilities, while faster students can be given additional enrichment or interest tasks. Through continual testing and monitoring, the problems of each student can be determined and appropriate materials and exercises prescribed. Freed from much of the detailed didactic instruction, the teacher can spend more time with students as individuals to ascertain the nature of individual problems of motivation and comprehension.

2. Demands to expand options and improve performance. The options made possible with a fully implemented PLATO system are more

diverse and more extensive than any educational institution can provide or even visualize today. Since computer-based education can avoid the lock-step necessary in the classroom approach to education, the educational program of a given individual student can be different from that of all other students. The student's personal objectives, background, and learning patterns can be used as a guide for program definition. The need for prerequisites and developmental or remedial instruction can be determined in the context of the specific needs of the student rather than from abstract consideration of educational needs by instructors and school administrators. This degree of individualization is a valid and crucial educational need created by the ever-increasing complexity and is not simply an idle demand on the part of immature students.

3. Imposition of hard financial constraints. The projected cost of a fully implemented PLATO IV system during the late 1970's is $0.35 per student-contact hour. The present range of equivalent costs is:

	Per school
Public school	≃ $0.70
Community college	≃ 1.50
University	≃ 3.00

As unionization of teachers increases and the costs of other services rise, these costs will rise considerably. Thus it is clear that computer-based instruction could have significant importance in lowering the costs of education. The manner by which such cost reduction can be accomplished at each level of education will vary, but at all levels a significant increase in productivity can be accomplished through the use of computer-based instruction.

At the elementary and secondary school levels the central problem facing our educational system is the failure to do an adequate job of education with conventional means. Approximately 25 percent of the graduates from public schools have less than a sixth-grade reading ability and an alarming percentage (as high as 15 percent) emerge as functional illiterates. A major portion of public school graduates are mathematical cripples, possessing inadequate competence to deal with even simple arithmetic problems.

Many of these graduates are not adequately prepared to cope with even the least demanding problems of everyday life in a complex society. Hence they are ill-prepared to enter the labor market in semi-skilled or skilled jobs. The resulting economic drain on society is increasingly burdensome and morally indefensible.

A number of pupils who have the inherent capacity for going on to colleges and universities are also turned off at an early age. Our society has belatedly recognized the need for highly educated and highly trained men and women from our disadvantaged minorities and many colleges and universities are now motivated to attract such students into higher education. However, we find the problems of the disadvantaged greatly accentuated by limitations in academic preparation; that is, by failure on the part of the educational process at elementary and secondary levels. Hence, at these levels the major role which computer-based education can play is to provide the capability at economically acceptable costs to remedy the inadequacies and failures of the schools in the development of critical learning skills.

The major problems faced by community colleges are associated with a very rapid expansion in student enrollments and a growing diversity of educational objectives. In 1969–70 the Nation's community colleges served approximately 2,100,000 students at an annual cost of approximately $1.5 billion. This enrollment has been projected to increase to 2.5 million students during the current year, an increase of almost 20 percent. These students are committed to a wide diversity of career objectives. There are demands for new kinds of education for all students and for new kinds of students previously unreached by education by virtue of age, geographic location, or disadvantaged economic or educational status.

The key objectives for the introduction of PLATO into this context will be: (a) The provision of superior instruction at lower costs and without the need for large increases in the instructional staff; and (b) the availability of more options, including developmental education, to a greater diversity of students.

Among the critical educational challenges facing universities today are strident but legitimate demands to meet the following educational goals:

1. Provide more options, more flexibility, smaller classes, and programs tailored to the individual student;
2. Reduce the proportion of instruction given by graduate teaching assistants;
3. Provide education which relates to the problems of society, education which crosses disciplinary fields and prepares students to deal with problems of a complex world; and
4. Provide educational opportunities for adults.

These demands on the colleges come at a time of rising costs and budgetary uncertainties. In a sense, the problem facing the 4-year institutions is similar to that of the public schools: To respond to critical unmet needs without increasing the level of financial and human resources currently available. In higher education as well as at precollege levels, computer-based education provides a feasible mechanism for more options and greater productivity.

In addition, one can predict that at this level of education considerable cost reductions can also be accomplished through a reduction in the time required for degree programs, thus increasing the efficiency of utilization of the physical plant and other facilities. PLATO would also permit an increase in the number of students that can be served by a given institution, particularly for the commuter campus. One can also permit an increase in the number of students that can be served well as undergraduate instruction offered at off-campus locations, thus providing for a new form of continuing education with major cost savings but without decreasing quality.

The introduction of PLATO into 4-year colleges and universities represents a major opportunity to bring much-needed change into an otherwise overly rigid structure and to provide economically feasible ways for a university or college to deal with a changing world and changing patterns of student life. It is particularly applicable to satisfying increasing demands for interweaving continuing educational objectives and professional careers. To satisfy these needs, higher education is under greater pressures to increase productivity than any other segment of the educational establishment.

IMPLICATIONS FOR THE FUTURE

We do not pretend to be able to foresee in detail the impact of PLATO IV on the educational establishment in the next few decades. However, we have enough data with PLATO III to be persuaded that certain assumptions about computer-based education can be made:

1. Computer-based education will be enthusiastically accepted by teachers and students alike at all levels of education.
2. Many new educational concepts will be introduced that are impossible to realize without the unique capabilities of the modern high-speed computer available to each student and each instructor.
3. Many new options will be made available to students through the provision of individualized instruction in complete courses or in smaller learning modules.
4. Human teachers, freed from the requirement for delivering basic didactic courses, will turn to PLATO for providing students with developmental instruction and the acquisition of basic skills.

If these assumptions are valid, it is interesting to speculate on the possibilities which could be made available to the Nation's educational institutions if the projected costs of PLATO IV are also attained. We believe it is of interest to specify how great an addition in educational capacity could be achieved if 5 percent of our annual budget for formal education were to be applied to the implementation of PLATO computer-based education in the Nation at large. This 5 percent figure corresponds to the inflationary rise in the cost of our educational services in each of the past several years.

The total cost of the formal educational enterprise has reached $60 billion annually. Following is a listing of the kinds of educational supplementation which could be achieved with $3 billion annually:

1. Elementary and secondary education. Provide one-half hour of individual instruction per day for each for 50 million pupils from age 6 to 18. This instruction would increase by a large fraction the amount of time devoted to individual instruction and could readily handle the major portion of instruction devoted to development of reading and mathematical skills. If human tutors were hired at $5 per hour, the resulting cost would be $30 billion a year. The cost using PLATO IV would be approximately $1.5 billion per year, to cover the installation of about 5 million PLATO IV student consoles.
2. Community colleges, 4-year colleges, and undergraduate education at universities. Double the total amount of currently available instruction at the community college level. Increase by 35 percent the amount of undergraduate instruction at universities and 4-year colleges. (Our institutions of higher education currently serve over 2 million students at community colleges and almost 6 million undergraduates at other colleges and universities.)

The total cost of this increase in instructional capacity using PLATO IV would be approximately $600 million per year, covering the cost of 500,000 student consoles. The cost of the existing enterprise in higher education is $20 billion per year.

This increase in available instruction could be used to reduce the average duration of the baccalaureate program from 4 to 3 years without increasing the teaching load on existing staff. In addition, it could provide individualized development instruction to students with inadequate background preparation for the level of instruction in a given course. Such instruction could be provided in learning modules as well as in complete course sequences. In addition, PLATO could take over a portion of the teaching load now carried by graduate assistants who could be freed to spend more time on their own education and be involved in teaching primarily as a part of their own learning experience. Some of their stipends could and should be converted to fellowships or research assistantships.

3. Continuing adult education. Provide for each of 15 million adults 100 student-contact hours of instruction annually in fields of their choices. Instruction could be aimed at updating skills and acquiring new concepts, aiding individuals to make changes of career or position, and helping ex-students who wish to return to formal education. The cost for the above instructional program using PLATO would come to about $0.5 billion. The cost by conventional methds might approach $10 billion.

Thus, the increased capacity in all three categories proposed above could be achieved for a total of about $3 billion annually. The cost by conventional means of instruction would exceed 10 times that figure! The above estimates assume the amortization of the entire capital investment in a 5-year period and include $80 per console for leasing and remodeling of space for computer facilities and student consoles. Furthermore, these estimates assume the use of the computers for only 8 hours per day. The reserve computational capacity of the PLATO IV computers would be made available to educational institutions for graduate research and data processing. This reserve computational capacity, a byproduct of the increased instructional output, would be several times the world's present computational capacity. Though approximate, the above numbers serve to give some idea of the leverage for change which computer-based technology could bring into our educational systems.

We have paid special attention to the economics of computer-based education in order to increase the likelihood of its adoption. However, the major implications of PLATO-like systems in education are even more profound and promise more far-reaching changes than those relating to instructional costs. With PLATO's capacity to reformulate knowledge through audio and visual displays and simulation of systems, the goal of teaching will not be to shovel verbal information into an abyss of ignorance but rather to foster capacities for understanding. At the same time, PLATO will provide a new avenue for cooperation through a manageable and well administered network relating computers, communications, and video and audio displays connecting universities, community colleges, and public schools in other cities and states. Under this system, opportunities for adult education could be greatly expanded, through the evening use of student consoles in public schools and learning centers at widely separate locations. Residence requirements for graduate degrees could be sharply reduced, and a whole new concept of public service for State universities could be realized.

Large-scale production and technological innovation will eventually bring the price of student consoles down to a point at which each console will become a part of a communication network reaching into homes, offices, and hospitals. The young child will be introduced to reading and mathematics before he enters school. The housewife will continue her education at home. The executive in his office will dial up a course in the language of the country with which he carries out business enterprises. The individual seeking a change of job or profession will have in his own home ready access to the training he needs. The shut-in might participate in games for entertainment or in learning about the field of his choice. Finally, PLATO will make available a whole new means of information transfer. The receiver of a message transmitted through PLATO will push a button and obtain a printed copy of the message only if he wishes to keep a record, lessening his dependence on an expensive and obsolescent paper technology.

As we look into the future and try to appraise the long-range effect of this new technology on the human condition, it is our conviction that PLATO will bring about a major change in the place of education in our style of life. In childhood, direct access to PLATO will provide every pupil with the opportunity to learn and not merely to be taught. Universal literacy (in both verbal and quantitative languages), long an objective but not an achievement, will become a reality. As he grows older the pupil will be able at all times and at his own pace to increase his capacities and skills. When he reaches college age, a wide variety of opportunities to interweave education with other career activities will accompany the breakdown of the lockstep of the instructional process in time and space. Thus, PLATO will make education a continuous part of the life experience of all people. The knowledge necessary to operate our complex society, now largely in the domain of narrow specialists and experts, will then become a part of the common understanding.

We view the PLATO IV experiment as a test not only of cost and effectiveness but also of acceptance by the educational community. We have approached the problem with the point of view that the failure of a new technology to be utilized is due at least as much to the limitations of the technology as to the limitations of the institutions that the technology was intended to serve. It is for this reason that the PLATO system has been designed expressly to engage students and teachers through the superior effectiveness of an interactive (rather than a passive) medium, and to appeal to educational administrators on the basis of budgetary and management advantages. Thus, we have not been oblivious to the problems of acceptance; rather we have assumed on the basis of our experience with PLATO III that PLATO IV will be enthusiastically received.

COMPUTOPIA AND CYBERCRUD

BY THEODOR H. NELSON

Here I am again. I regularly cry in the wilderness at banquets, conferences, and other ceremonial events. I have been doing my thing for 10 years, and giving these talks and publishing articles for 5, with little result. My articles have apparently been boycotted by Computing Reviews. I seem to be the Electronic Eyesore.[1]

The truth is that I am not really trying to interest computer people. They are the ones who only seem to tell me, "It can't be done." There turns out to be no answer to that. Many times I have come up with a way to do something, in which case the man who said it couldn't be done usually says, "Why would you want to do such a thing, anyway?"

It is the laymen and literati, the noncomputer people, I want to reach. But this also seems futile. A few laymen and literati occasionally seem to become quite turned on; but without experts to confirm what I say is possible, they gradually edge away and don't listen either. I feel like Marco Polo in his later years, no longer Italian and certainly not Chinese, trying to interest one in the other.

I am here again to say what I always say, not so much to influence anybody now as to say "I told you so" later. I would rather say what I think, and seem to be a lunatic, than try to make a favorable impression by lying about my true opinions. This way also I can treat you to a shock of recognition several years hence, when you say to yourself, "Oops—that was the prediction."

In 1966 I spoke at Rand, also under Roger Levien's sponsorship. The 1966 talk, "Hard and Fast Thoughts for a Softcopy World," is perhaps interesting in several respects. I made a number of crazy predictions. They seem less crazy now, and various of them have come true already. I have nothing to retract and relatively little new to say, except for a few details.

What Roger has asked me to talk about again tonight is "the computer as a medium." But that doesn't quite put it my way. I see the computer as the heart of the new presentational systems of the future—and this vision seems curiously different from what we generally hear. What we must work on are the principles of presentation, not of computers or other technology.

We are usually told, on various sides, that some kind of revolution of human information is upon us, but somehow in the course of things the computer will make this revolution inhuman. Chugga-chugga, we will have to learn obtuse query languages. Rattle-clank, we will get answers back in symbolic logic. (Too bad for some of us.) Tippity-tap, the terminal will tell us a thing and then ask us what it told us. Tell and test, tell and test, instant boredom, but who dares argue with science?

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[1] See especially, A File Structure for the Complex, the Changing, and the Indeterminate, Proc. ACM 1965; and Getting It Out of the System, in Schechter (ed.), Information Retrieval: A Critical Review, Thompson, 1967. The tale is poignantly told in Barnum-Tronics, Swarthmore College Bulletin (Alumni Issue), December, 1970.

The title of my talk is a slanted dichotomy: "Computopia and Cybercrud." However, these terms may need a little elucidation.

"Computopia" is of course a portmanteau of "computer utopia." Each of us in computers has (or should have) his own computer utopia, some vision of a future better world in which the computer figures prominently.

Unfortunately, there are many trivial horizons being offered the world by computer people: shallow possibilities, uninformed aspirations. I refer not only to commercial enthusiasms—one sees published articles with titles like "New Horizons in On-Line Credit Reporting"—but also to cramped visions of the ideal. Cramped visions are all too common; but the worst thing is that here they are contagious. They are sold to the public as technically necessary, and the public doesn't know any better. This is the cybercrud problem: advice and creation of systems, supposedly based on technical requirements, whose categories and rigidities are unnecessary. In the worst cases they are not only unnecessary but wrong.

If the public doesn't know what is technically possible, you can sell them any inflexible kludge and tell them it has to be that way. Unfortunately, technically sophisticated people forget how uninformed and timorous about such matters the rest of the world is.

Once I was surveying individual departments in a big company, having been assigned to find out if any new technologies could be used in the work at hand. Now, I couldn't just ask, "How could technology help you if you knew more about it?," since that's like asking, "What fact that you don't know is the most important?" So I developed a little song-and-dance for the purpose. "Suppose," I said, "that anything was technologically possible. Suppose it's the year 2000." (This premise was the tongue-loosener. Somehow the year was sufficiently unimaginable, or the sense of having to be answerable for the consequences could be suspended.) "Suppose technology could give you anything you asked for," I said. "What could your department use?"

The interesting thing I learned was that when you asked mature people in business what they might want in the year 2000, they almost invariably: (a) wanted computers to take dictation, but otherwise (b) came up with things which were presently possible, though perhaps expensive or awkward. But one reply I will never forget came from a lady in charge of a language teaching program. "I suppose that by the year 2000," she mused, "each child could have his own tape recorder."

The horizons I am talking about lie a little further. Within the coming decade we will see the explosive growth of computer display, an expansion that will rival or surpass that of television, and compare in ubiquity to the very telephone. We are going to have an entire cultural revolution based on computer display.

It is my belief that many important benefits can flow from this revolution, if we do it right. I believe enlightenment, knowledge, and understanding can be furthered throughout the public. I believe creativity can be fostered in many of its forms. And I believe a new and important freedom of information is possible.

This is my prediction and my call to battle; evidently few of the most ardent enthusiasts of computer display go so far. But if it is correct, it means a revolution in human life and thought comparable to what followed Gutenberg. My interest is in giving shape to that revolution, in urging it toward enlightenment and humanist freedoms, rather than having it stumble accidentally into the formalization of dreariness.

There is no overall term for what I am talking about. "Information retrieval" and "computer-assisted instruction," with their false ring of exactitude, say less than they seem to. "Computer display" is a technology. But I would like to propose a term for what I am talking about: *fantics*, the art and technology (in that order) of showing things.[2] The major precepts of such a field should be to make things look good, feel right, and come across clearly. The use of screens and computers is indicated.

What will these screens be for? And what will be on them? Many people seem to be in the grip of the travel-agent idea—that screen terminals will be for bank clerks and airline reservation people. Sure, for a while. But they are also going to be in the home. (And if we have them in the home, they may not be needed by travel agents.)

I want a world where we can read the world's literature from screens rather than personally searching out the physical books. A world without routine paperwork, because all copying operations take place automatically and formalized transactions occur through formalized ceremonies at consoles. A world where we can learn, study, create, and share our creations without having privately to schlepp and physically safeguard them. There is a familiar, all-embracing motto, the jingle we all know from the day school lets out, which I take quite seriously: "No more pencils; no more books; no more teachers' dirty looks." The Fantic Age.

If you asked me what my computopia is, then, I would say a sort of Woodstock with terminals. With terminals on all sides, we can more easily go barefoot and pocketless. I propose to turn on people's minds with display screens rather than drugs.

Those of you who have moved your possessions and papers while switching universities are aware of the burden on the individual of retaining documents and records in paper form. This weight off our shoulders will be a pleasant side benefit. But I see two greater steps we will be taking. Our screen-and-computer systems will help us in the difficulties of organizing thought, of revising writings, of indexing complexities. And when our works are finished, we will send them out on screens—marvelous new forms of writing and illustration.

In dark contrast to such a possible enlightenment, I would like to point out an unfortunate tendency, occasionally a villainous practice, which we may call *cybercrud*. By *cybercrud* I mean putting things over on people using computers.[3]

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[2] The term, etymologically impeccable, is from the Greek fanein, to show. The pleasing connotations of fantasy, fancy, and fantastic are fringe benefits.

[3] Since in the course of present-day technology promotion we find ourselves affronted with too many cruddy words beginning with "cyber-," I thought it was time to coin my own "cyber-" word, one that would be explicitly, rather than implicitly, cruddy.

The derivation of "cybercrud" is as weaselly as its meaning. To the general public, the word "cybernetic" means, rather incorrectly, "related to computers," whereas from a technical point of view it more exactly means, "concerning control linkages." Thus the prefix "cyber-" has the proper connotation of "spuriously related to computers." The actual Greek "cyber-" meant "steersman." Thus at the microlevel we may think of "cybercrud" as meaning, "steering into crud, with spurious connotations of computerishness."

Cybercrud can take many forms, all related. The computer's cachet may be used to hide your premises, the way you want to do things, the secret loadings of your approach and procedures. The computer, its accessories, and terminology, can give the semblance of validity to all sorts of procedures or statistics. The term "computer" is to many a rubber stamp meaning "scientific."

We may use the computer, or the mention of it, to perplex, intimidate, or bamboozle. This, too, is cybercrud. The following subscription renewal letter has a certain charm.

> Dear Subscriber:
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> Because [our] * * * subscription roll is maintained by electronic computer, it is necessary for us to assign a common expiration date to all subscriptions. This enables us to distribute copies and mail renewal notices to all subscribers at the same time. Therefore, we are writing to inform you that your * * * subscription must be renewed *now* * * *.

We may note that while this electronic computer requires all subscriptions to end at the same time, it nevertheless does not require all subscribers to live at the same house or have the same name.

Cybercrud is most surreptitious, even if benignly and sincerely, in the "one-way" form. This consists of presenting one's own way of doing things as *the* way, hiding the fact that it is one of many alternatives. Of course it is natural, in the throes of enthusiasm, to forget to mention alternatives, to present as scientific the consequences foisted by one's premises. "This is how the computer bakes a pie!" says the press release—and recipes are not compared.

With the public so flummoxed by computer news, and so easily taken in by breakthrough pronouncements, the mischief of this tendency is great. "You have to submit out of technical necessity" is the gist of this form of cybercrud. This is equally unfortunate when said by computer salesmen or by professionals prematurely set in their ways.

Of course, it is possible to believe sincerely that one's own way of doing things is the computer's way, the only way it can be done by computer. But we know that this is rarely if ever so. Actually the computer is a *tabula rasa*, a projective system, whose behavior takes on the preconceptions, and sometimes the personality, of those who set it up. But the possibilities can far exceed what given individuals think of. And this is the problem that brings us here tonight.

Education

That school is stupid, boring, and insulting need scarcely be mentioned, except that we tend to forget it. We forget the inanity, the complete nonsensicality of most grade school and high school pursuits. Their insignia of officiality somehow seems to make them right. What matter if children's good time is being wasted by astrology, candle-dipping, or Euclidean derivations? Any nonsense will do, so long as it leaves a trail of *grades*, evaluations etched in history that can be used to blackmail the victims or their parents.

Curricular timing and grading virtually obliterate the nature and natural interest of every subject. It is as though we were taken in groups to visit national parks in the back of a truck, racing on a treadmill. Every possible activity is related to a made-up standard; nothing is allowed to be merely interesting. For those on the up side, the system furnishes clues as to direction of reward; for those on the down side, the presumption of *own failure* is affixed to the subject. Few of us do not learn that we are "no good" at something, and adult regrets are heavy with both the realization that it could have been different and self-blame that it was not.

Some remarkable traditions govern the structuring of subjects as we teach them. But they are no more in the nature of the things to be learned than the cuts of steak are in the anatomy. Every subject has a beginning, a middle, and an end: it is laid out by the assigned reading and precisely bounded by the scope of the final exam; every topic may be reduced to shallow enumerations strung on vague explanatory connections, dismally explained inanities, explanations which associate phrases without a sense of meaning, and incompletely explained "skills" to be practiced without insight. Questions and other matters therefore become either "relevant" or "not relevant," according to whether they fit the boundaries and sequence of the "subject." And thus it can come about that the answer to a question is, "Just learn what you're told."

We have been misled into believing that all this is how it has to be: The cascade of premises flows into a landlocked swamp.

The idea of prerequisites and "basics" is one of the few justifications for having curricula at all. In a few clear cases—say, the differentiation of mathematical functions, or punctuating correctly—it is impossible to do the more complex detail work without having learned exactly to do the simple detail work. But I believe that such cases have grossly misled us. We suppose that because some learning sequences cannot be circumvented, then all learning should be reduced to sequences. This has several disastrous consequences.

First, unique curricular paths. The curricula of the schools are generally designed as pathways radiating from some primal state of ignorance, wagon-wheel spokes without the wheel. The only way to learn most things in school is by taking an exactly prescribed series of intermediate steps. There is no way around. And if one has not taken the steps between, a thing simply cannot be learned.

The psychological consequence is most pernicious. There are things one "knows" (if the details are forgotten, one is still oriented) and things one "does not know" (there has been no introduction, no orientation). A sense of weakness is produced; one drops a subject that has come up; one shrugs. But this is only part of it. What is much worse is that when one has "failed" in a subject, all further thoughts about this subject are darkened, colored by this sense of failure. One avoids; one strives actively to find other interests or distractions: "Aw, never mind that stuff."

Last, the sociological consequence. We produce people with funneled minds, the so-called "types"—the literary type, the scientific type, the mathematical type. And an occupational structure around these types. And subcultural divisions. And everybody stays where he feels safe, and everything interesting in the world is hidden from almost everybody.

A lot of people I talk to say, "I don't think it's as bad as you say, but I agree that the educational system can be improved." But I'm not sure it *can* be improved. The system is geared and swivelled to do exactly what it does: discourage and mediocrify in the guise of sticking to business. It's not merely a question of whether real improvement is possible within the system, but also of whether it would still be the system if we made any real improvements. Imagine (if you can) people growing up without a self-stereotype of structured disabilities, who thought they could do anything if they worked at it. Imagine most people having a real choice of occupations. Imagine if the classroom atmosphere could be stripped away and the students put in genuine rapt communion with the subject—a state which teachers are sometimes deluded into thinking they achieve—without the deleterious effects of competition, time pressure, and stigmata for real participants. Imagine kids experiencing the excitement of intellectual issues—and not just as a fleeting part of that grim academic exercise, writing a paper. Imagine students actually interested in school. Or whatever we would now have to call it.

Designed and Signed Works in Computer Media

Roger Levien says that the part of my 1966 talk he remembers is the discussion about "the computer as a medium." Let me go into that in some detail.

I said this: A number of new media will come about, employing computers or other digital means. The computers will store, respond, display, and follow complex directives about their response. What they show will consist of *works*, intentionally organized things whose impact on the viewer or participant has been designed, much like the parts of a picture, a book, or a movie.

By "media," then, I mean stabilized forms of presentation that people will create works in, for other people to use and enjoy. The presentation may be carried out by computers; but its plan, and the viewer's feelings, will be mediated by other human beings.

We have many media now: The newspaper, the movie, the phonograph record, the TV show, and many more, each with its own variations. We understand these media and the people who do things in them: we understand the position of the reporter and the columnist, the photojournalist and the movie director, and their contributions in bringing us facts, impressions, and visions.

Yet for some reason we have failed to extend this understanding to the media that will be brought to us by the computer. There is a floating myth that computer media will be different from all those that have gone before, either thrown together on the fly by the machine itself, or presenting passive nonedited descriptions of the world, or dutifully constructed on scientific principles by psychologists who remain aloof from the content. I find all of these ideas rather absurd, especially since to formulate them we ignore our extensive experience with other media.

If the computer itself puts together presentations for us, it is acting not as a medium but as a facility, according to rules we will wish to control. (Even if it presents a montage or pastiche, the locus of action is still not the computer, but the formula for what the computer is doing.)

The second view is that the computer and dispiay will merely dip into some data collection which passively describes the world. One new machine, the Evans and Sutherland LDS–1, dips into a three-dimensional data structure, much as a goldfish net is dunked to surround guppies. The user may roam and wheel through whatever world is represented in core memory, with almost no programing needed. Such systems might leave one thinking of the material to be shown as simply a view of the world, a neutral representation or assortment, to be routinely prepared by anonymous coders. (Simply to describe it this way shows the suspiciousness of this view.)

The third possibility is a view that there are neutral or colorless scientific methods for organizing presentations, especially those methods growing out of learning theory. This seems to me like saying that since photography is optical, photographers should be trained in optometry, or that record producers need to study psychoacoustics. It is not necessarily relevant to what should be done or what the media are going to be about. If the principal impact of a teaching system is a matter of feelings, appeal, and cognitive handles, as I believe, then these are where we must place the emphasis.

But this is the general view in computer-assisted instruction. That instruction must be the presentation of sequenced chunks and questions in a conversational format seems to have become a bold premise, generally blotting out other possibilities of computer teaching. At best, computer-assisted instruction can be very good indeed, in which case the only possible criticism is of the immense cost of preparing materials. But at worst, it seems to be a conspiracy to do some of the worst things school has ever done: Cut and dry the material, spoon-feed, bore, and insult the participant.

I think none of these models represents the main thing that will happen. Rather, people will be designing display-based media and creating works in these media. Indeed, people will be signing them, just as ever before, and viewers will seek out the works of particular authors much as we do now in every other medium.

We have gotten to my position and main interest. I believe the computer's astonishing possibilities as an aid to the human mind and imagination have scarcely been touched, and the new media made possible by the computer and display will be miraculous and awesome.

I have suggested using the prefix hyper- in general for multidimensional and nonsequential computer media, those having some kind of complex order within which the user may roam.

Since computers can control any other equipment, we may expect new media which tie together old forms of presentation in new ways; for instance, the branching motion picture (hyperfilm), or branching audio. But I suspect that all of these hybrid systems will be comparatively unwieldy—the expense of branchable film transport systems, for instance, is immense compared to all-digital systems—and interest will converge rather soon on the purge digital media for the computer's own display: the hypertext and hypergram.

Prestidigitative Publishing

To supply our scopes with the hypermedia we will want to read, I foresee a new era of publishing, and a whole new publishing industry. In this coming era the digital files of the publisher will be connected by telephone (or other means) to the subscriber's console. As you ramble through typertexts or explore hypergrams, the news of your actions will be flashed to the great feeder machines at the publishers' distribution centers. These feeder machines will disgorge to the customer the furtherances of what he is doing, keeping him continuously supplied. The material will be copyrighted, and small royalties will be continuously billed for screen-minutes of presentation. Entirely new creations and the works of the past will be equally and quickly available. Enchanted gardens of information, prearranged by authors and editors, will be available to you. Screen pyrotechnics and display tricks will be intertwined with pictures and text. There will be anthologies, magazines, encyclopedias—or things like them.

A related development will be creative facilities, systems for using computer displays to help in creative activity. Publishers will serve as storage warehouses for the overflow from such systems, and probably buffer materials and messages being sent privately among users.

The user will be able to perform input and complex parallel annotation, keep a trail of his own activities, and backtrack through his own past actions and those of others. In other words, Vannevar Bush's "memex" will come about substantially as he saw it.[4]

STRETCHING THE IMAGINATION

An important human tendency is to rationalize and order what we hear. I have found that people at my lectures continually assimilate what I say about hypermedia to some pulsating "new world of communication" they have heard about, mushing together computer-assisted instruction, information retrieval, holography, and even cartridge TV.

I often talk about stretchtext, not because I am so attached to it, but because listeners who understand the concept cannot continue to believe I am talking about the usual stuff.

"Stretchtext" is a form of hypertext I have suggested for discursive written subjects, such as history and the social sciences. In stretchtext, the reader may control the amount of detail to suit himself; as he pulls on a throttle or some other control, additional words and phrases appear on the screen, and the rest move apart to make way; as he pushes the throttle in the other direction, words and phrases disappear, and the rest of the text slides back together.

The presentation should never change sharply. Smooth motion of the text pieces on the screen is utterly essential. For instance, a long sentence should, as expansion continues, be broken into two short sentences as similar to their parent as possible.

Although we have as yet no firm evidence, my slight experience trying to write stretchtext suggests that it is no harder to write, and perhaps easier, than ordinary prose. To each small piece of text is assigned an altitude, or degree of stretch, at which it is to come and go. The problem is basically to lay out an overall expository structure and then find some way to compress it gradually without large jumps or reversals of sequence.

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[4] The particularities of this prediction are pursued in my article "As We Will Think. presented at the September 1968 meeting of The American Chemical Society (to be published).

Discrete hypertexts and hypergrams are essential and basic. Simply put, these are writings and pictures with footnotes that extend in all directions. Touch an asterisk, or perform some equivalent act, and the system will bring another connected thing to the screen.

More complex hypergrams are very desirable, particularly those capable of immediate and smooth response on the screen. Consider, for example, a map on your screen which you may move around the world and zoom in on any part, to any degree. Look at the whole United States and zoom in on Secaucus, N.J., and environs. By various manipulations the user should be able to overlay this picture with populations, climate, historical events, light industry, or crime statistics.

Consider another hypergram: a picture of the human brain which the user may actually manipulate in three dimensions. (This is a particularly interesting example because of the stereoscopic complexity of the brain.) The user should be able to rotate, magnify, zoom in, change perspective and viewing angle, brighten different subsystems, and obtain annotations.

Finally, consider a cartoon human body on the screen, having various simple animations (heartbeat, peristalsis, etc.) and permitting the user to open it up in various ways and views, as well as get labels, explanations, and other annotations.

It will be noted that in none of these media have I made any reference to sequence. Thus it will be plain that these activities are not the same as the prescribed-sequence formal activities being pursued generally under the name of computer-assisted instruction.

Finally, it may be divined that these systems overlap in function with both information retrieval and computer-assisted instruction. I am persuaded that neither discipline, in its larger sense, can or should have a separate existence. Information retrieval, unless it deals with the simplest facts, must also involve orientation and learning materials. And, as I have already pointed out, systems intended for teaching will need to open up whole new areas of option, until they become very, very like hypertext.

INTENTIONS AND PRIORITIES

The next question in your minds may be, where does all this lead? If instructional sequences are not the right place to put our effort, what sort of things do we do next?

There are two answers. On the one hand, we should be trying out new organizations of information, grand complexes of words and pictures that the user can peruse, explore, and learn from. Unfortunately, present presentational systems are very badly suited to this purpose. Conventional computer systems are designed with other things in mind, and I am increasingly convinced that some rather basic changes are needed before proper environments are available.

Speaking for my own aspirations, and those of The Nelson Organization, Inc., with which I am coextensive, I believe one of the best possible contributions to civilization would be the creation of new media to be digitally stored and interactively studied. It is our hope to become the fountainhead of these new forms of writing, reading, teaching, and the ordering of thought, and to offer materials to people with appropriate consoles within a few years. By copyright and authorial credit we hope to establish a position both as a supplier and as a place for talented people who want to create the new works.

These people will not be technicians or psychologists. They can have been writers, artists, movie-makers, the creative people of advertising, editors, photographers, museum people. They will be people who enjoy creative construction and who have a special sense of visualization, space, word and picture; and (I would guess) people who have loved at least one responding machine, be it bicycle, camera, typewriter, or automobile.

Why not computer people? Because in one sense the computer part is the easiest. They used to say at Life magazine, in the old days any way, that a photographer could be taught to write much more easily than a writer could be taught to take pictures. I think that the same obtains here: The writers and artists can probably absorb most of what they need to know about computers for hypermedia in a short time. A few may eventually get into system design and tradeoff, but I expect the basic forms of CRT hypermedia to stabilize rapidly.

But for the present not much can be done. There is no point in creating these materials now, and without proper systems it is far too much trouble. It is fun to design hypertexts in a vacuum, but not very much. The difference between trying to imagine it working and having it do so is roughly like the difference between a bearskin rug and a bear. Designing hypertexts without a proper system is rather like preparing magazine pasteups before printing presses were invented. It only gives you more designs to have to explain to people who will call them vague conjecture.

Before these materials can be created and distributed, we need people to have sufficiently opulent systems. Using the LDS–1, Evans and Sutherland have demonstrated the sort of zoom-in hypermap I spoke of. But an Evans and Sutherland display setup is a matter of $500,000 or more, and hardware at this level of investment is not worth talking about for teaching anybody anything, except perhaps how to get appropriations for computers. Similarly, the Brown University Hypertext Editing System, which I had a hand in,[5] permits the comfortable creation and reading of discrete hypertexts. But for that you need an IBM 360 with 2250 mod 2 display console, another immense outlay, so that too is not practical.

For all intents and purposes of The Nelson Organization, Inc., it is necessary to have wonderful consoles. And this is therefore the current thrust of our Project Xanadu: To put mountains under our castles in the air.

Naturally, this cannot all be done at once.

The prototype, which we hope to build in 1970–71, could not practicably be sold for under $100,000. But we have in mind, building on this, a commercial system a few years away whose price is more like $10,000, including all software for CRT hypermedia, and including CRT, screen, keyboard, dashboard, tablet, disk, and communicator. This would require, however, a whole new approach, utilizing through-designed hardware and system programs. I will shortly talk about some of the approaches we are looking at.

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[5] Gross, Carmody, Nelson, Rice and van Dam, "A Hypertext Editing System for the 360," Proceedings of the Second Annual Conference on Computer Graphics, University of Illinois, 1969.

DESIDERATA

Keyscopes, or text display consoles, are not yet what they should be. While the more attractive units, such as the Datapoint 3300, are now comfortable and attractive enough for long hours of use, they are not yet sufficiently zingy for the hypertexts we are going to want. The most important feature such text consoles will need, in my view, is some capability for smooth text motion. Only if you can see where a piece of text is coming from, and which way it goes, can your eye and mind remain oriented. (Unless the display space is trivial, say, one made up of pages, or long scrolls.) Moreover, variable-sized characters, italics, other fonts, and serifs are all desirable, in that order.

It is possible that keyscope terminals, such as the TV raster-chopping type, might be improved along these lines, but the engineering might be difficult (and the engineers unmotivated). For these reasons I put my hope in calligraphic systems—those which draw with a programable beam of electrons, such as DEC's 338, IBM's 2250, the Adage terminal, the Vector General display, and so forth.

And for the general purposes of CRT hypermedia, even the best, excepting always the miraculous Evans and Sutherland machine, is not yet good enough. The finest calligraphic displays, such as the 2250 and Adage terminals, are usually hampered by the big computers that support them. A sudden refusal to respond often means the main computer is stopping to print something or punch somebody's cards.

Some way has to be found out of this. The usual solution proposed is to have more and more immense computers doing the main work for the display. The solution I favor is to use the display's little computer better and use big computers less or not at all.

XANADU

The term "Xanadu" I have used since 1966 as an ongoing project name for the console I have wanted to build. The overall set of ideas and preferences has been churning in my head since 1960. Its functional specifications, frozen along with its name, now seem within reach. I called it Xanadu after the pleasure dome in the poem "Kubla Khan," with its connotations of mysticism and artistic trance, to say nothing of the cachet added by Orson Welles' appropriation of it as the name of Citizen Kane's palace.

Here was the idea of it:

1. It was to be created for the naive, antinumerical, and accident-prone user. There were to be no visible numbers, save those explicitly put in by the user. Unintended actions by the user could not harm his files or undo his work, because of several levels of backup, fail-safe, and warning. (At the extreme, procedures of the utmost gravity would be required for dangerous and irreversible actions, similar to the protocol said to be established for the firing of intercontinental missiles. For instance, for the user to throw a thing away completely, expunging all copies of it, he would really have to want to. Several stages of

warning would occur, to be overridden by complex acts, culminating in a phased two-handed maneuver while a small hooter siren went woop-woop-woop, all accompanied by ominous pyrotechnics on the screen.)

2. The system was to have a nonstructure. Transparent in the sense of Oettinger and Marks,[6] it would provide an unaffected view into structures of any character which resided as data within the system. All length and size problems were to be overridden, with the user uninformed of storage breaks in the material or where what parts were stored. Indeed, the different memory levels of core, disk, and tape were to be treated as a seamless whole by the system program, with automatic shipping and swapping as required. (This is now called virtual memory, although the term has acquired technical meanings which are not quite relevant.)

3. The system was to be psychologically oriented to whatever task was at hand, without confusing technicalities from another realm (a previous program, or unexplained system features) hanging around to confuse the user. More subtly, the *atmosphere* of the console was to be changeable by various means to make it feel like the place to be doing what you were doing. Button-overlays do not go nearly far enough. A variety of cues, including color, button shapes, and decorative embellishment of the screen, must be delicately crafted. If we seek to create an orientational and conceptual world for the user, both the unification and aesthetics of this world are of supreme importance.

4. The system was to be smoothly adapted for text reading, writing, and editing, with the simplicity and fail-safe qualities I have spoken of. I mean text in the larger sense, including hypertexts.

5. A nonnumerical indexing mechanism was to allow one sequence of text to provide an index into another piece of text. This could be not only an ordinary table of contents, but a digest, commentary, or other collateral structure or version.

6. The system was to allow users to consider and compare alternate versions and arrangements of the same material, stored simultaneously and interconnectedly. Any versions could be changed and worked on, with their interconnections and correspondences maintained automatically.

7. A historical trail feature, plus a backtracking mechanism, would permit a user to travel backward in time through earlier versions and stages of his writings, or his other work and considerations, at the scope. Correspondences among such things would be maintained automatically through the parallel and alternative mechanisms already mentioned. Moreover, by returning to an earlier version and making changes to it, he could retroact with his work, pursuing alternatives earlier foregone and initiating evolutionary forks from a previous time. The object of this facility is not to burden the user with peculiar options, but to help him explore more swiftly the possible pathways for developing his ideas and work that would ordinarily be foreclosed to him.

8. Finally, the system was to be beautiful, and its use a continual pleasure.

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[6] Anthony G. Oettinger, with Sema Marks, Run, Computer, Run: The Myth of Educational Innovation, Harvard University, 1969, p. 19.

So much for the external specifications. How to do all this inside is another problem. Five years ago I didn't know much about certain important things. With cantankerous faith I blundered on.

Collateral Data Structures

First, I recognized that a certain relationship was essential and basic. I have called it different things at different times, "zipper list" being the simplest. The idea is that two lists, or structures, have their corresponding parts noted in the data structure, without regard to the relative sequence of their parts. A zipper-list facility would permit such relationships to be taken note of and kept track of, despite other development in the file.

Now, computer people I talked to thought this was a pretty stupid thing to be bothering with, especially since in the glorious realms of list processing you are allowed to tie your data in knots every whichway. Why bother with monogamous one-for-one links when list processing gives you orgies? Yet this is precisely the relation I think is most basic for tasks of creative consideration, although there are many variations. If two things have corresponding parts, whether they are symphonies or machines or individual drafts of some particular book, we need some way to notate these correspondences for computer storage. An item-for-item parallel listing structure is therefore appropriate.

What to call these things is puzzling. Parallel lists? "Parallel" has difficult connotatons. "Zipper list" is not bad when the sequence of elements is significant. But when we are talking about correspondences between knotty wholes, such as machines or philosophies, we need a nonsequential term. The term "collateral structures" seems both sufficiently expressive and neutral. I define two data structures as collateral if at least one has some sort of private integrity, and the other holds information relevant to it.

The more I thought about collateral data structures, the more interesting they became. First, there was the idea of looking up textual parts of one thing by corresponding textual parts of another—a zipper-list pair. Then there was the idea of having alternative versions of the same thing, whose correspondences are kept track of. More zipper lists. Moreover, the indexing of a list, by a list can be extended indefinitely.

Another lead appeared. It might be very useful to have pure text stored in one stream, without codes or irregularities outside the character set, and have its formatting and indexing in other streams. Parallel pointers from outside differentiate the data. More zipper lists. Indeed, it could be useful for many nontextual purposes to store data in one stream and related metadata in another—"a little something on the side."

These different leads seems to be converging.

Another feeling I had was that there was something basically wrong with the way displays were being programed and designed. Sutherland's original sketchpad program seemed to have been set in concrete in the design of various machines, on top of which the conventions of input and output provided many, you will excuse the pun, stumbling blocks. We seem to require *n* buffers, all different; various stacks of niggling errands; and still attention from a main computer. It seemed to me that there must be some way to simplify things.

OPULENCE

There is no time to discuss here the way this has worked itself out, but the comeuppance has been a rather unusual system design, now ready for implementaton. Out of the original desiderata has come an unusual underlying set of structures, conventions, and peculiarly integrated design tricks.

Built around a minicomputer, it should permit the animation of dynamic display without flicker, even as the data rolls or changes; the definition of indefinitely many hypertext types and connections; and ways of defining new windows into mind-space. In other words, an opulent input-output machine, sufficient for the richest user activities we may want to program. Its main purpose is to let us create, write, and experience more knowingly, and wander freely through the multidimentional realms of hypertext and hypergrams. But it is hoped that the fundamental design may be extended to provide windows into mind-space of any complexity.

END

If we are to move toward anyone's computopia, or even the simpler goal of a more human and humane world in which computers are prominent, what experts call technically necessary will have to come under close public scrutiny.

Doubletalk and silly press releases have done their damage. The public has been told what experts think the computer should do to them; now the public is down on computers and, by these lights, rightly. It is time for a new accommodation.

And we who have known enough to do so will have to stop fooling the public. To insiders, the computer is not just a tool, but a costume we wear when we want to further our own ways of doing things, much as Bugs Bunny masquerades as a tiptoeing tree trunk. We have gotten away with this long enough. Ordinary people will have to learn enough about computers to evaluate technical assumptions critically, as they already are in the politics of automobiles and garbage.

Computer teaching is an area ripe for public understanding. I suggest that such understanding should begin, not with contemplation of rigidified and sequenced systems, but with an appreciation of the playgrounds and wonderlands for the mind that may now be created. Later we can find what methods of presentation are best, if any may be called "best"; but people must understand first the magnificence of computer display and where it can lead.

A sense of awe is essential to work in this area. If there is a failure of awe, you do not understand computer display.

And perhaps that says something about education. For awe and understanding to occur at the same moment is perhaps the pinnacle of the human experience. It is certainly the most important moment of education, if it ever occurs. The two sides of the mind, feeling and insight, are no more separate than the two sides of a coin. Both must be served. Both must act together. How the person feels at the console largely determines what he will learn for good.

I believe one university built in the thirties had a skyscraper called the Cathedral of Learning. That doesn't put it badly. If a cathedral is a place of awe and communion, then our new cathedrals of learning will be our presenting and responding consoles. The architecture of these consoles, and the crafting of their responsiveness and their virtual spaces, is a worthy task.

Starting from general concerns, I have tried briefly to explain one man's obsessions and pursuits, tied together as interconnected ideas rather than merely as an enumerated list. I propose two general solutions for a lot of problems: hypertexts for teaching, "information retrieval," and ordinary reading and writing; and, at a very different level, revised programing structures to break the input-output bottleneck for small display computers. But I do not claim that these approaches have unique technical imperative or divinely inspired epistemological virtue. Or that they are the only things worth doing. They are simply among the many, many things that should be tried. To claim otherwise would really be cybercrud.

TEACHING CHILDREN THINKING

BY SEYMOUR PAPERT*

This paper is dedicated to the hope that someone with power to act will one day see that contemporary research on education is like the following experiment by a 19th-century engineer who worked to demonstrate that engines were better than horses. This he did by hitching a $\frac{1}{8}$-horsepower motor in parallel with his team of four strong stallions. After a year of statistical research he announced a significant difference. However, it was generally thought that there was a Hawthorne effect on the horses.

1. INTRODUCTION

The phrase "technology and education," usually means inventing new gadgets to teach the same old stuff in a thinly disguised version of the same old way. Moreover, if the gadgets are computers, the same old teaching becomes incredibly more expensive and biased toward its dullest parts; namely, the kind of rote learning in which measurable results can be obtained by treating the children like pigeons in a Skinner box.

The purpose of this essay is to present a grander vision of an educational system in which technology is used not in the form of machines for processing children, but as something the child himself will learn to manipulate, to extend, to apply to projects; thereby gaining a greater and more articulate mastery of the world, a sense of the power of applied knowledge and a self-confidently realistic image of himself as an intellectual agent. Stated more simply, I believe with Dewey, Montessori, and Piaget that children learn by doing and by thinking about what they do. And so the fundamental ingredients of educational innovation must be better things to do and better ways to think about oneself doing these things.

I claim that computation is by far the richest known source of these ingredients. We can give children unprecedented power to invent and carry out exciting projects by providing them with access to computers, with a suitably clear and intelligible programing language and with peripheral devices capable of producing on-line real-time action.

> Examples are: spectacular displays on a color scope, battles between computer-controlled turtles, conversational programs, game-playing heuristic programs, et cetera. Programers can extend the list indefinitely. Others can get the flavor of the excitement of these ideas from movies I shall show at the IFIPS meeting.

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*This paper is deeply influenced by Cynthia Solomon and Marvin Minsky.

Thus in its embodiment as the physical computer, computation opens a vast universe of things to do. But the real magic comes when this is combined with the conceptual power of theoretical ideas associated with computation.

Computation has had a profound impact by concretizing and elucidating many previously subtle concepts in psychology, linguistics, biology, and the foundations of logic and mathematics. I shall try to show how this elucidation can be projected back to the initial teaching of these concepts. By doing so much of what has been most perplexing to children is turned to transparent simplicity. Much of what seemed most abstract and distant from the real world turns into concrete instruments familiarly employed to achieve personal goals.

> Mathematics is the most extreme example. Most children never see the point of the formal use of language. They certainly never have the experience of making their own formalism adapted to a particular task. Yet anyone who works with a computer does this all the time. We find that terminology and concepts properly designed to articulate this process are avidly seized by the children who really want to make the computer do things. And soon the children have become highly sophisticated and articulate in the art of setting up models and developing formal systems.

The most important (and surely controversial) component of this impact is on the child's ability to articulate the working of his own mind and particularly the interaction between himself and reality in the course of learning and thinking. This is the central theme of this paper, and I shall step back at this point to place it in the perspective of some general ideas about education. We shall return later to the use of computers.

2. The Don't-Think-About-Thinking Paradox

It is usually considered good practice to give people instruction in their occupational activities. Now, the occupational activities of children are learning, thinking, playing, and the like. Yet, we tell them nothing about those things. Instead, we tell them about numbers, grammar, and the French revolution; somehow hoping that from this disorder the really important things will emerge all by themselves. And they sometimes do. But the alienation-dropout-drug complex is certainly not less frequent.

In this respect it is not a relevant innovation to teach children also about sets, and linguistic productions, and Eskimos. The paradox remains: Why don't we teach them to think, to learn, to play? The excuses people give are as paradoxical as the fact itself. Basically there are two. Some people say: We know very little about cognitive psychology; we surely do not want to teach such half-baked theories in our schools; And some people say: Making the children self-conscious about learning will surely impede their learning. Asked for evidence they usually tell stories like the one about a millipede who was asked which foot he moved first when he walked. Apparently the attempt to verbalize the previously unconscious action prevented the poor beast from ever walking again.

The paradox is not in the flimsiness of the evidence for these excuses. There is nothing remarkable in that, all established doctrine about education has similarly folksy foundations. The deep paradox resides in the curious assumption that our choice is this: Either teach the children half-baked cognitive theory, or leave them in their original state of cognitive innocence. Nonsense. The child does not wait with a virginally empty mind until we are ready to stuff it with a statistically validated curriculum. He is constantly engaged in inventing theories about everything, including himself, schools and teachers. So the real choice is: Either give the child the best ideas we can muster about cognitive processes, or leave him at the mercy of the theories he invents or picks up in the gutter. The question is: Who can do better, the child or us? Let's begin by looking more closely at how well the child does.

3. The Pop-Ed Culture

One reads in Piaget's books about children reinventing a kind of Democritean atomic theory to reconcile the disappearance of the dissolving sugar with their belief in the conservation of matter. They believe that vision is made possible by streams of particles sent out like machine gun bullets from the eyes and even, at a younger age, that the trees make the wind by flapping their branches. It is criminal to react (as some do) to Piaget's findings by proposing to teach the children "the truth." For they surely gain more in their intellectual growth by the act of inventing a theory than they can possibly lose by believing, for a while, whatever theory they invent. Since they are not in the business of making the weather, there is no reason for concern about their meteorological unorthodoxy. But they are in the business of making minds—notably their own—and we should consequently pay attention to their opinions about how minds work and grow.

There exists amongst children, and in the culture at large, a set of popular ideas about education and the mind. These seem to be sufficiently widespread, uniform and dangerous to deserve a name, and I propose "The Pop-Ed Culture." The following examples of pop-ed are taken from real children. My samples are too small for me to guess at their prevalence. But I am sure very similar trends must exist very widely and that identifying and finding methods to neutralize the effects of pop-ed culture will become one of the central themes of research on education.

EXAMPLES OF POP-ED THINKING

(a) *Blank-Mind Theories.* Asked how one sets about thinking a child said: "make your mind a blank and wait for an idea to come." This is related to the common prescription for memorizing: "keep your mind a blank and say it over and over." There is a high correlation, in my small sample, between expressing something of this sort and complaining of inability to remember poetry.

(b) *Getting-It Theories.* Many children who have trouble understanding mathematics also have a hopelessly deficient model of what mathematical understanding is like. Particularly bad are models which expect understanding to come in a flash, all at once, ready made. This binary model is expressed by the fact that the child will admit the existence of only two states of knowledge often expressed by "I get it" and "I don't get it." They lack—and even resist—a model of understanding something through a process of additions, refinements, debugging, and so on. These children's way of thinking about learning is clearly disastrously antithetical to learning any concept that cannot be acquired in one bite.

(c) *Faculty Theories.* Most children seem to have, and extensively use, an elaborate classification of mental abilities: "he's a brain", "he's a retard", "he's dumb", "I'm not mathematical-minded". The disastrous consequence is the habit of reacting to failure by classifying the problem as too hard, or oneself as not having the required aptitude, rather than by diagnosing the specific deficiency of knowledge or skill.

4. Computer Science as a Grade School Subject

Talking to children about all these bad theories is almost certainly inadequate as an effective antidote. In common with all the greatest thinkers in the philosophy of education I believe that the child's intellectual growth must be rooted in his experience. So I propose creating an environment in which the child will become highly involved in experiences of a kind to provide rich soil for the growth of intuitions and concepts for dealing with thinking, learning, playing, and so on. An example of such an experience is writing simple heuristic programs that play games of strategy or try to outguess a child playing tag with a computer controlled "turtle".

Another, related example, which appeals enormously to some children with whom we have worked is writing teaching programs. These are like traditional CAI programs but conceived, written, developed and even tested (on other children) by the children themselves.

> (Incidentally, this is surely the proper use for the concept of drill-and-practice programs. Writing such programs is an ideal project for the second term of an elementary school course of the sort I shall describe in a moment. It is said that the best way to learn something is to teach it. Perhaps writing a teaching program is better still in its insistance on forcing one to consider all possible misunderstandings and mistakes. I have seen children for whom doing arithmetic would have been utterly boring and alienated become passionately involved in writing programs to teach arithmetic and in the pros and cons of criticisms of one another's programs like: "Don't just tell him the right answer if he's wrong, give him useful advice." And discussing what kind of advice is "useful" leads deep into understanding both the concept being taught and the processes of teaching and learning.)

Can children do all this? In a moment I shall show some elements of a programing language called LOGO, which we have used to teach children of most ages and levels of academic performance how to use the computer. The language is always used "on-line", that is to say the user sits at a console, gives instructions to the machine and immediately gets a reaction. People who know languages can think of it as "baby LISP", though this is misleading in that LOGO is a full-fledged universal language. Its babyish feature is the existence of self-contained subsets that can be used to achieve some results after 10 minutes of instruction. Our most extensive teaching experiment was with a class of seventh grade children (12-year-olds) chosen near the average in previous academic record. Within 3 months these children could write programs to play games like the simple form of NIM in which players take one, two, or three matches from a pile: soon after that they worked on programs to generate random sentences—like what is sometimes called concrete poetry—and went on from there to make conversational and teaching programs. So the empirical evidence is very strong that we can do it, and next year we shall be conducting a more extensive experiment with fifth grade children. The next sections will show some of the elementary exercises we shall use in the first weeks of the course. They will also indicate another important aspect of having children do their work with a computer: the possibility of working on projects with enough duration for the child to become personally—intellectually and emotionally—involved. The final section will indicate a facet of how more advanced projects are handled and how we see the effects of the kind of sophistication developed by the children.

5. YOU CAN TAKE THE CHILD TO EUCLID, BUT YOU CAN'T MAKE HIM THINK

Let's go back to Dewey for a moment. Intellectual growth, he often told us, must be rooted in the child's experience. But surely one of the fundamental problems of the school is how to extend or use the child's experience. It must be understood that experience does not mean mere busy work. Two children who are made to measure the areas of two triangles do not necessarily undergo the same experience. One might have been highly involved (e.g. anticipating the outcome, being surprised, guessing at a general law), while the other was quite alienated (the opposite). What can be done to involve the mathematically alienated child? It is absurd to think this can be done by using the geometry to survey the school grounds instead of doing it on paper. Most children will enjoy running about in the bright sun. But most alienated children will remain alienated. One reason I want to emphasize here is that surveying the school grounds is not a good research project on which one can work for a long enough time to accumulate results and become involved in their development. There is a simple trick, which the child sees or does not see. If he sees it, he succeeds in measuring the grounds and goes back to class the next day to work on something quite different.

Contrast this situation with a different context in which a child might learn geometry. The child uses a time-shared computer equipped with a CRT.* He programs on-line in a version of the programing language LOGO, which will be described in more detail below.

On the tube is a cursor point with an arrow indicating a direction. The instruction "FORWARD 100" causes the point to move in the direction of the arrow through 100 units of distance. The instruction "ROTATELEFT 90" causes the arrow to rotate 90°.

The child knows enough from previous experience to write the following almost self-explanatory program:

```
    TO CIRCLE     FORWARD 1     ROTATELEFT 1     CIR-
    CLE     END.
```

The word "TO" indicates that a new procedure is to be defined, and it will be called "CIRCLE". Typing "CIRCLE," will now cause the steps in the procedure to be executed one at a time. Thus:

1st step:	FORWARD 1	The point creeps ahead 1 unit.
2d step:	ROTATELEFT 1	The arrow rotates 1°.

---

*Cathode ray tube, or TV-type screen.

3d step:	CIRCLE_________________	This is a recursive call: naturally it has the same effect as the command CIRCLE typed by the child. That is to say, it initiates the same process:
1st step:	FORWARD 1____________	The point creeps on, but in the new, slightly different direction.
2d step:	ROTATELEFT 1________	The arrow now makes an angle of 2° with its initial direction.
3d step:	CIRCLE_________________	This initiates the same process all over again. And so on, forever.

It is left as a problem for the reader to discover why this point will describe a circle rather than, say, a spiral. He will find that it involves some real geometry of a sort he may not yet have encountered (see answer at end of paper). The more immediately relevant point is that the child's work has resulted in a certain happening, namely a circle has appeared. It occurs to the child to make the circle roll? How can this be done? A plan is easy to make:

Let the point go round the circle once.
Then FORWARD 1
Then repeat.

But there is a serious problem! The program as written causes the point to go round and round forever. To make it go just once around we need to give the procedure an "input" (in more usual jargon, a variable).

This input will be used by the procedure to remember how far round it has gone. Let's call it "DEGREES" and let it represent the number of degrees still to go, so it starts off being 360 and ends up 0. The way this is written in LOGO is:

```
TO CIRCLE=0 STOP_____ :DEGREES means: the thing
                          whose name is "DEGREES".
IF :DEGREES=0 STOP
FORWARD 1
ROTATELEFT 1
CIRCLE :DEGREES—1___ Each time round the number of de-
                       grees remaining is reduced by 1.
END.
```

Now we can use this as a subprocedure for ROLL:

```
TO ROLL CIRCLE 360    FORWARD 10    ROLL    END.
```

Or, to make it roll a vxed distance:

```
TO ROLL :DISTANCE
IF :DISTANCE=0 STOP
CIRCLE 360
FORWARD 10
ROLL :DISTANCE—1
END.
```

Or we can make the circle roll around a circle:

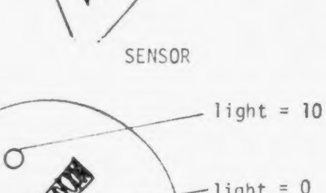
```
TO FUNNYROLL   CIRCLE 360   FORWARD 10   RO-
TATELEFT 10    FUNNYROLL.
```

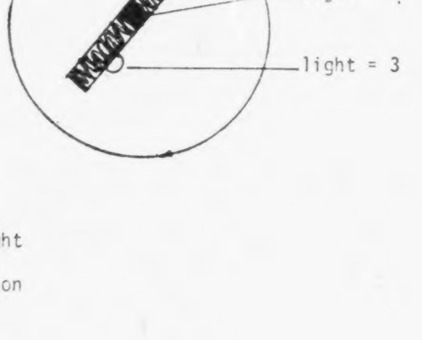
These examples will, if worked on with a good dose of imagination, indicate the sense in which there are endless possibilities of creating even more, but gradually more, complex and occasionally spectacularly beautiful effects. Even an adult can get caught up in it! Not every child will. But if he does, the result is very likely to be a true extension of his experience in Dewey's sense. And evidence is accumulating for the thesis that there is scarcely any child who cannot be involved in some computational project.

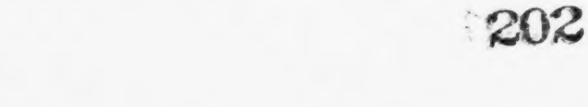
The next two sections will discuss two other peripheral devices suitable for a computation laboratory in an elementary school: a programable vehicle and a music generator. There is, of course, no end to what one could invent. At MIT we are thinking in terms of soon adding mechanical manipulators, psychedelic light shows in a reactive environment, apparatus for automated experiments in animal psychology, and so forth.

6. THE LOVE OF THE TURTLE

At MIT we use the name "Turtle" for small computer controlled vehicles, equipped with various kinds of sense, voice and writing organs. Turtles can be controlled by the same commands used in the previous section to describe graphics. They can be made to draw or to move about without leaving a visible trace. Procedures to achieve this are exactly like the procedures for CRT graphics. However sense organs allow another interesting dimension of work. An interesting simple one is a reflectivity sensor held close to the floor. A LOGO operation called LIGHT has an integer value between 0 and 10, depending on the reflectivity of the surface. Suppose we wish to program the turtle to follow the left edge of a black line on a white floor. Using an important heuristic we encourage the child to study himself in the situation, and try to simulate his own behavior. The key idea, of course is to use feedback according to the following plan:







Color	*Light*	*Position error*	*Correction*
Mainly black	small value	Too far right	Rotateleft.
Equal black and white	5	OK	Nothing.
Mainly white	big value	left	Rotateright.

This leads to the procedure:

```
TO WALK
IF LIGHT <4  ROTATELEFT
IF LIGHT >6  ROTATERIGHT
FORWARD 1
WALK
END.
```

Notice that the child can think of the program as a very simple formal model of himself, or, indeed, more justly, of a moth flying to a light. It is rare that children in the traditional context of math-science get a chance to develop a model so simple.

Turtles with touch, interactive behavior with several turtles, searching mazes, and so on scarcely scratch the surface of what can be done with these beasts.

7. Music

Just as the computer can be instructed to move a point on a TV display or make a turtle move or print a word, it can be instructed to sing a note. The LOGO instruction SING followed by an input to indicate a note (represented by 1 . . . 7) or a time. A program can be written thus:

```
TO MARY    SING 3    SING 2    SING 1    SING 2
SING 3    SING 3    END.
```

The command:

```
MARY
```

will cause the computer to sing the tune.

The program:

```
TO CHANTMARY    MARY    CHANTMARY    END.
```

will cause the tune to be repeated indefinitely. Programs can be written to speedup, slowdown, raise, lower, transpose, sing in chorus, et cetera, et cetera. Children can use the computer as a super musical instrument. They can compose at the typewriter and hear their creations played perfectly. They can make and undo small changes. They can cause the turtle or the CRT display to move to music and so on endlessly.

8. Case Histories Form the Muzzey Jr. High School Experiment

The following piece is extracted verbatim from a report on the seventh grade teaching experiment performed at Muzzey Jr. High School at Lexington.

8.1. PROBLEM VS. PROJECT

The most exciting single aspect of the experiment was that most of the children acquired the ability and motivation to work on projects that extend in time over several days, or even weeks. This is in marked contrast with the usual style of work in mathematics classes, where techniques are taught and then applied to small repetitive exercise problems. It is closer, in ways that are essential to the later argument here, to the work style of some art classes where children work for several weeks on making an object; a soapcarving for example. The similarity has several dimensions. The first is that the duration of the process is long enough for the child to become involved, to try several ideas, to have the experience of putting something of oneself in the final result, to compare one's work with that of other children, to discuss, to criticise and to be criticised on some other basis that right or wrong. The point about criticism is related to a sense of creativity that is important in many ways which we shall talk about later—including, particularly, its role in helping the child develop a healthy self-image as an active intellectual agent.

Let's take an example. A continuing project over the last third of the year was working on various kinds of "language generating" programs. The children studied a program (given as a model) which generated two word sentences like:

```
CATS RUN
DOGS SHOUT
CHILDREN BITE
DOGS RUN
CATS RUN
•
•
•
```

The assignment was to study the model and go on to make more interesting programs. The sample printout that follows brought great joy to its creator who had worked hard on mastering the mathematical concepts needed for the program, on choosing sets of words to create an interesting effect and on converting her exceedingly vague (and unloved) knowledge about grammar into a useful, practical form.

```
INSANE RETARD MAKES BECAUSE SWEET SNOOPY
SCREAMS SEXY WOLF LOVES THATS WHY THE SEXY
LADY HATES UGLY MAN LOVES BECAUSE UGLY DOG
HATES MAD WOLF HATES BECAUSE INSANE WOLF
SKIPS SEXY RETARD SCREAMS THATS WHY THE
SEXY RETARDS HATES THIN SNOOPY RUNS BE-
CAUSE FAT WOLF HOPS SWEET FOGINY SKIPS A FAT
LADY RUNS
```

The next class assignment was to generate mathematical sentences which were later used in "teaching programs." For example:

```
8*BOX+6=48
WHAT IS BOX?
```

Finally, in the last weeks, someone in the class said she wanted to make a French sentence generator ... for which she spurned advice and went to work. In the course of time other children liked the idea and followed suit—evoking from the first girl prideful complaints like "why do they all have to take my idea?" The interesting feature was that although they took her idea, they imprinted it strongly with their own personaliies, as shown by the following case studies:

K.M.: The girl who initiated the project. Thoughtful, serious about matters that are important to her, often disruptive in class.

Her approach to the French project was to begin by writing procedures to conjugate all the regular verbs and some irregular ones. The end of the school year fell before she had made a whole sentence generator. But she did have a truly professional program, completely debugged and working with great competence at conjugating—e.g. given Vous and Finir as inputs it would reply: "Vous Finissez."

M.R. A gay, exuberant girl who made the "Sexy Computer" program quoted above. Only half seriously she declared her intention of making the first operational French sentence generator. In a sense she did—but with cavalier disregard for the Academy's rules of spelling and grammar!

J.C. A clear mind with a balanced sense of proportion. Deliberately decided to avoid the trap of getting so involved with conjugation that no sentence would ever be generated. Too serious to allow his program to make mistakes. Found a compromise: he would make a program that knew only the third person—but was still nontrivial because it did know the difference between singular and plural as well as the genders: thus it would say

Le Bon Chien Mange; but Les Bonnes Filles Mangent.

8.2 A DETAIL FROM A CHILD'S MATHEMATICAL RESEARCH PROJECT

The fine texture of the work on projects of this sort can only be shown by case studies. The following vignette needs very little reference to LOGO—thus illustrating how the projects are more than programing.

J is the author of the last French program mentioned. A little earlier he is working on generating equations as part of a project to make "a program to teach eighth grade algebra." He has perfected a program to generate equations with coefficients in the range of 0–9 using a "random" number generator. His present problem is to obtain larger coefficients.

First solution: Almost everyone tries this: get bigger numbers by adding smaller ones obtained from the old procedure. Amongst other considerations, this looks like a good technique that has often paid well: use old functions to define new ones.

Consequences: J chooses his equation generator but soon finds some annoying features.

The new coefficients are in the range 0–18, which is unnatural and not very big.

There is a preference for some numbers e.g. 9 comes up ten times as often as 18!

Comment: The first problem can be alleviated by adding more numbers. One can even add a random number of random numbers. But this aggravates the second problem. J understands this qualitatively but does not see a way out. It is interesting that children and adults often have a resistance to making numbers by "non-numerical" operations. In this case the solution is to concatenate the single digit random numbers instead of adding them. LOGO has a simple way to express this and J is quite accustomed to making nonnumerical strings by concatenation. In fact this is how he makes the equation! Nevertheless he resists.

The problem is discussed in a class meeting and after some prompting everyone suddenly "discovers" the solution.

New solution: J changes his program, now making numbers up to 99 by concatenation; he does some crude check of uniformity of distribution and tries his program.

Disaster: For a while it seems to go well. But in the course of playing with the "teaching program" a user types 5 and is surprised to get a reply like:

> You knucklehead; You took 11 seconds and your answer is wrong.
> The answer is 05. Here is some advice . . etc.

Comment: Poor J will get the sympathy of every mathematician who must at some stage have tried to generalize a result by extending the domain of an innocent looking function only to find that the extended function violates some obscure but essential condition. He is also in the heart of the problem of representation. Is "05" a good representation? Yes, no . . . have your choice but face the consequences and be consistent. J's problem is that his procedures accept "05" for arithmetic operations but not for the test of identity!

Solution: Change the identity test or peel off the leading zero. J chose the latter. His program worked for a while and was used, in ways that we shall see, to great effect.

New step: Later J was urged to allow negative numbers. He found a good way: Use the one digit random number generator to make a binary decision:

> If less than 5, positive
> Otherwise, negative.

That problem again: J had a program working perfectly with negatives. Then one day decided to make it more symmetrical by using +5 and —5 for positive and negative. This brought him back to the old problems raised by differences between the machine's representation and the human user's. At this point the year ended with J's program not quite as effective as it had been at its peak.

THE POTENTIAL CONTRIBUTION OF COMPUTERS TO INSTRUCTION REFORM

BY HAROLD E. MITZEL

The popular journals print numerous articles on the subject of the pervasive role of 53,000 extant computers in our society.[1] Many view with alarm the possibility that massive computer storage and retrieval capability can be employed to reduce man's privacy and prevent men from living down their earlier mistakes.[2 3 4] Some feel that the mere presence in our society of the computer which schedules airline seats, records bank deposits, adds up department store purchases, and routes long distance telephone calls also serves to dehumanize interpersonal relations and diminish the quality of life. The purpose of this paper is to show how computer technology should be viewed as a friendly giant rather than an evil genie and how it should be harnessed to provide the catalyst for badly needed reform in the education of Americans.

In order to restrict the paper's scope, I will only deal with the computer's potential in instruction and omit the familiar administrative and student accounting computer applications which are, of course, a part of the total education scene.

The existence of a number of well written critiques,[5 6 7] whose conclusions are supported by facts reported in almost any issue of a big city newspaper, makes it unnecessary to document in detail the idea that there is a crisis in schooling at the beginning of the 1970's. There is a crisis in confidence between the lay public and educators and between education workers and boards of control. There is a crisis in financing schools as school costs rise more rapidly than tax revenues. There is a crisis in achievement as many children come up to age and grade guideposts unable to meet minimal literacy standards. I believe a root cause of many of these crises lies in the badly deteriorated relationships between teachers and pupils in classrooms. Further, reform in instruction can, and indeed must, pave the way for ameliorating many of the other tensions related to the education of Americans.

The crisis in teacher-pupil relationships is borne out by the school statistics on excessive absences, vandalism, drug abuse, riots, violent attacks on authority figures, and even murder of a teacher as recently happened in Philadelphia. No doubt there are multiple causative factors which explain these asocial behaviors, but underlying all of them is the elementary notion that most children do not like school. At worst, school is perceived as a primitive, spirit-destroying place which fills no essential needs in children's lives. Most teachers and administrators are viewed as adults who holler at the kids, and as persons who enforce petty rules and wield arbitrary power. A kind of adversary system dominates the classroom interaction of most schools in which the teacher and his backup reserves, the principal and guidance counselor, are pitted against the pupils. While destructive interpersonal games are played out in the typical school, the rest of society stands on the sidelines wringing its collective hands.

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[1] Computers and Automation. Monthly Computer Census, *20*, pp. 5961, Jan. 1971.

[2] Alexander, T. Computers can't solve everything. *Fortune*, Oct. 1969, *LXXX*, 126–129.

[3] White, P. T. Behold the computer revolution. *National Geographic*, Nov. 1970, *138*, 593–633.

[4] Computers are changing your life. *U.S. News & World Report*, Nov. 10, 1969, 71, 100–103.

[5] Holt, J. C. How children fail. New York : Pitman, 1964.

[6] Kozol, J. Death at an early age. Boston : Houghton Mifflin, 1967.

[7] Silberman, C. Crisis in the Classroom. New York : Random House, 1970.

One of the first things we must do to reform schools is to markedly increase the manifest expression of human warmth between adults and children. Essentially the challenge is how to change the emotional climate of the typical elementary and secondary classroom without sacrificing progress by the children in the achievement of subject matter goals. All youngsters must be able individually to get rewards and praise for their honest attempts to learn. To provide children with massive doses of praise and other indications of their self-worth, we have to arrange for a much much higher level of feedback or effort evaluation than is characteristic of the typical classroom which provides a cage for 25–30 children, one teacher, and a variety of inert materials. Careful studies of classroom behavior [8] show that most lessons above the primary levels are conducted as either an expository lecture or a class discussion on some topic; or, in other words, class activities consist of telling and recitation. Individual pupils have, under typical conditions, only minimal opportunities to directly interact with the teacher who must somehow instruct 30 children as if there were only one.

In a previous article [9] I have shown how the aggressive able youngster in a class discussion may recite and receive feedback, including praise 4 or 5 times during a 40-minute class period. A shy, withdrawn child is easily overlooked and unnoticed, and may recite with expressions of teacher approval only once a week. Contrast that mass-education picture with the computer-assisted instruction work room where every child receives feedback and encouragement of his learning efforts once every 30 seconds on the average for a total of 80 different rewarding and informative exchanges in a 40-minute period at the computer terminal.

With sensitive programing computer terminals create for school children an absorbing responsive environment for learning. The child knows that when he makes a response something will happen immediately to provide him with an appraisal of the quality of his response and offer him guidance toward his future efforts. There is little wonder that 450 ninth-graders in a Pittsburgh high school,[10] who spend a portion of their daily mathematics lesson at the computer terminal and a portion in individualized study with print media, markedly prefer the computer experience.

So far we have discussed the superiority of the computer terminal over conventional mass instruction in creating a responsive environment associated with typical learning activities. But, there is an additional opportunity for greatly improving the quality of school climate when computer tutorials are introduced into schools.

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[8] Reviewed in Medley, D. and Mitzel, H. "Measuring Classroom Behavior By Systematic Observation", pp. 247–328 *in* Gage, N. (Ed.) "Handbook of Research on Teaching," Chicago, Rand McNally, 1963.

[9] Mitzel, H. "The Impending Instruction Revolution," *Phi Delta Kappan*, Vol. LI, No. 8, pp. 434–439, 1970.

[10] Mitzel, H. and Bost, W. in Morphet, E. and Jesser, D. (Eds.) "Designing Education for the Future," Denver, The Project Office, 372 pp., 1968.

To understand this second opportunity we can classify teacher's skills in the classroom as being of higher order and lower order. Examples of lower order skills can be suggested as presentation of information to be learned, display of drill and practice exercises, evaluation of pupil responses and provision of feedback. Some examples of higher order skills are diagnosis of a child's learning disability, mediating a dispute, assessing the impact of a pupil's home environment upon his in-school behavior and expressing comfort for a wounded spirit or an injured body. The cause of instruction reform would be greatly advanced if the lower order skills as defined above were largely put into carefully sequenced computer programs. The savings in time for teachers by removing the necessity for them to engage in lower order skills would enable them to transfer their uniquely human talents to the higher order skills for which there is no computer programing in the foreseeable future. Of course, many teachers would have to be retrained in order to shift their emphasis from lower order skills to the higher order ones.

Silberman [11] documents the great interest being expressed by American educators in the British Infant School model. By minimizing structure and emphasizing pupil freedom to inquire and explore, those schools are unquestionably improving school-going attitudes on the part of youngsters. Many Americans will, however, be unable to accept the absence of the traditional lesson plan with its interest-aroused activities, presentation, exhortation, and followup by the teacher, all of which "turn off" most children in today's schools.

Since the close of World War II, about two and a half decades ago, Americans have been trying to improve their schools by increasing the subject matter knowledge of classroom teachers. Federally sponsored institutes since the passage of the National Defense Education Act of 1958 have made it possible for a significant segment of the Nation's secondary teachers to be upgraded in their knowledge of a subject. The rationale for this new interest in in-service teacher education was, of course, the notion that a teacher cannot teach well those subjects which he does not himself know well.

It seems to me that the heavy emphasis placed on pupil acquisition of hard content, characteristic of the postsputnik era, has been bought at the price of a declining interest and concern among educators for the human values which should be a part of schooling. This is not to say that educators ought to be less achievement-oriented than they are now, but that we have to recognize that the total complex job of teaching in a contemporary school makes impossible demands upon the talents of the more than 2 million persons in the teacher corps. Relatively few, perhaps only one in a thousand, possesses sufficient native ability to engage simultaneously in both lower order and higher order teaching behaviors in the conventional mass education classroom. If we shifted a major portion of the lower order presentational skills to a rich computer-assisted instruction environment and then retrained our typical teachers to engage in and emphasize higher order human relations skills in the classroom we could in a decade perhaps reform the bulk of the education of Americans.

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[11] Silberman, C., op. cit.

It is a paradox that computers, epitome of impersonality and product of the space age, offer us an opportunity to reform our schools by making it possible for teachers to redirect their efforts and to humanize schooling.

So far we have argued in this paper that instruction as a major segment of American elementary and secondary education can be reformed by introducing appropriately programed computer interactive opportunities for children. This reform can occur for two reasons—(1) Youngsters working at computer terminals experience a unique responsive environment which builds their self-confidence and feelings of self-worth; (2) teachers can, when freed from lower order expository tasks, engage in supportive higher order behaviors that are uniquely humanizing for children.

In addition to the two reasons cited above for incorporating computer technology into instruction, the computer makes "thinkable" for the first time in history, the notion of a genuine adaptive education for every learner.[12] The idea of individualizing instruction has been given consideration in every decade of this century. Its implementation has, of course, fallen far short of the goal because of the unavailability of instructional systems which can receive, process, and display large amounts of relevant data about individuals. Tyler [13] has shown that the concept of individualized instruction has been arrested at the simplex level of learner self-pacing. The programed text and teaching machine developments of the 1955–65 era contributed mightily to the self-pacing notion. These applications, however, ignored the rich diversity of individual differences among learners and failed to capture the essential notion that instruction needs to be adapted to the particular skills, abilities, and interests of learners who vary tremendously.

The logic and preprogramed decisionmaking capabilities of the modern digital computer make it the only candidate immediately in view that can handle the complex task of monitoring, summarizing, diagnosing and prescribing instructional moves for many learners. Of course, educators do not yet know in any detail which of the hundreds of descriptive variables about learners are relevant for instruction. But this needed evidence represents an empirical question which can be derived from the experience of programing courses of instruction for computer presentation and trying them out on learners with many hypotheses about different learner-adaptive variables.

Almost everyone these days who is weighing the potential of the computer for education in the next three decades seems to be viewing computers as mere replacement mechanisms for contemporary procedures, personnel, and learning activities. I believe the nature of this powerful logic and decision device makes it incumbent upon us to reexamine our educational goals for all learners. The computer makes it possible for educators to greatly expand the available curriculum for learners. The knowledge retrieval capability of large computer systems plus the storage and use of adaptive information about learners will make it possible for every learner to have a unique curriculum. No longer will debates about curriculum be restricted by what can comfortably be taught to an average group of youngsters at a particular grade level. The computer as a tool makes it possible for learners individually to have access to a wide variety of the world's knowledge. Instead of the long debates about what is worth teaching, educators will be able to shift this responsibility in large part to the learner himself.

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[12] Mitzel, H., "Computers and Adaptive Education," *American Education*, pp. 23–26, December 1970.

[13] Tyler, R., "New Directions in Individualizing Instruction," in the Abington Conference of 1967, Abington, Pa.: The Conference, 1967.

We have for a long time recognized the motivating effects of self-direction or independent study. If instruction can be, to a large measure, put into computer storage, and learners given a wide variety of choices in deciding what they want to learn and in what sequence, then the education enterprise will be blessed with increased motivation and improved learner self-direction. Of course, these applications of the computer in removing the shackles on education cannot be expected by the end of this decade, but we can have them much sooner than many people realize because they depend on no new technological developments or no new pedagogical concepts. The major restraints lie within the social institutions responsible for education.

Speaking of restraints on education brings one inevitably to the question of costs for triggering the reform of instruction with computers. Most of the available cost studies [14] either view computers as an add-on expense or as a replacement for existing teacher services. Neither seems to me to be an appropriate assumption. Cost studies also start with the notion that "instant CAI" in 20,000 school districts is both desirable and possible. The automobile has revolutionized the transportation of Americans, but nobody suggested that it was necessary in 1910 to have 80 million vehicles and a $40 billion interstate highway network. The development and improvement of automobiles over the years increased the demand for better roads, better service stations, better insurance, et cetera. The same phenomenon can be anticipated with the installation of computers in schools. If there is a significant beginning, there will be a demand for better curriculum packages, better maintenance service, and better hardware. Some venturesome schools will have to begin the implementation cycle even though the hardware is inadequate and the curriculum for the computer is spotty in its coverage. It will take these schools with a pioneering spirit to create a "market" for improved devices and instruction, whether these materials are produced commercially or by consortiums of public enterprises.

Cost studies [15] [16] [17] now available seriously underestimate the necessary impact of computer instruction applications upon the structure and organization of the school. There is every reason to believe that with a major program of computer use, schools will change their staffing patterns and building requirements. My guess is that CAI schools will need many fewer $15,000-per-year teachers and more $25,000- and $7,500-per-year personnel. CAI schools will be organized into small 100–200 pupil units even at the secondary level, with a considerably lessened demand for librarians, guidance counselors, remedial reading teachers, et cetera, although these lowered requirements will be offset to some extent by personnel needs in computer technology. Comprehensiveness, which provided the major rationale for today's giant urban high schools, can be met in part by a variety of individualized computer-based courses of instruction in small intimate decentralized units. Computers seriously applied to educational programs will change the building patterns and revise costs. For example, if high schools were smaller and nearer to pupils homes, would we still have to build, furnish and staff cafeterias? Perhaps the single major cost saving with a computer-based program is the change from teacher-directed, adult-controlled pupils to self-directed and self-monitored pupils. No one doubts the desirability of the latter and its capability of offsetting some of the costs inherent in the incorporation of computers into instruction.

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[14] Silberman, C., op. cit.

[15] Booz, Allen and Hamilton. "Costs of Installing and Operating Instructional Television and Computer Assisted Instruction in the Public Schools." Booz, Allen and Hamilton, Management Consultants, New York, 1968.

[16] Committee for Economic Development, Innovation in Education: New Directions for the American School, Statement by the Research and Policy Committee, July 1968.

[17] Kopstein, F. F. and Seidel, R. J., "Computer Administered Instruction Versus Traditionally Administered Instruction: Economics," Professional Paper 31-67, Human Resources Research Office, the George Washington University, June 1967.

In short, it is probably futile to attempt to project the costs of incorporating computers into instruction given the present model provided by contemporary schools. To make sense out of costs, we will need some new models for schooling which are explicit about educational goals and which capitalize upon those new objectives that are made attainable, in theory at least, by the application of computers to instruction.

In summary, the thesis of this paper is that reform in the education of Americans is badly needed. Central to that reform is an improvement in the social climate of schools and the interaction between pupils and adults. Paradoxically, computers can make a significant contribution to the humanizing of the schools by taking over many of the lower order expository skills from teachers' present repertoires and releasing them to become, with retraining, warm human beings sensitive to the personal needs of children. The computer can help improve the climate of classrooms by providing immediate ego-building feedback and encouragement for learners' efforts. The third plus for the computer in instruction reform is its potential in realizing a genuine adaptive education for every learner. So far, the notion of adaptive education has been pretty well arrested at the level of learner self-pacing, but the computer's capability of dynamically modifying every learner's instruction on the basis of many different relevant variables opens up new opportunities for education. Fourth, the computer encourages the establishment of new individualized goals for education by making it possible for learners to exercise many choices and options in guiding their own development. Opening up the world of knowledge to learners who have the tools to make choices cannot help but exert a liberalizing influence on education.

Estimating the costs of using computers to lead the reformation of instruction is tricky business. Current cost estimates seem high because of the retention of some hidden assumptions about the present structure and organization of the schools.

INFORMATION SCIENCE

BY ALLEN KENT

A. The Library and Information Science Field—Review

The field of information science is derived from the struggle of man to control his environment, or at least to avoid being destroyed by external forces. The struggle articulates into requirements to make decisions continually. The quality of the decisions is dependent fundamentally on the problem-solving capability of the decisionmaker, but initially on the quality and relevance of information brought to bear on the problems. Here, then, is the fundamental rationale for man to accumulate and organize information relating to past accomplishments of civilization.

Emphasis on the information science field has grown in the past several decades because of five interrelated factors:

(1) TIME SCALE CHANGES

The time scale of information gathering for decisionmaking and control has been reduced drastically. This change corresponds to increases in the rates with which competitive activity, international aggressive action, and changes in public opinion can deteriorate economic, military, and political situations.

(2) CHANGES IN QUANTITY OF AVAILABLE INFORMATION

There has been a dramatic increase in the amount of information that is freely available (i.e., published in one form or other), resulting in the characterization of the situation as an information explosion. This situation has three dimensions of frustration:

(*a*) The impossibility of an individual reading and remembering all of the literature that has a reasonable probability of being of later use.

(*b*) The economic impossibility of individuals or their organizations processing for later retrieval the majority of literature of probable pertinent interest.

(*c*) The breakdown of traditional library tools in coping effectively with the detailed requirements of individuals in identifying information pertinent to a given problem.

(3) CHANGES IN NATURE OF INFORMATION REQUIREMENTS

The increasing complexity of the problems of society has led to a consequent requirement for information from an ever-widening diversity of fields. This has resulted in the need to achieve insight into otherwise obscure or uncertain situations through the use of large amounts of fragmentary information from widely scattered sources.

(4) CHANGES IN IMPORTANCE OF INFORMATION SOURCES

The increasing internationalism of industrial, educational and political organizations has been leading to increasing emphasis on information for decisionmaking and control derived from many sources and geographic areas not formerly considered important. This trend has increased the need for obtaining and providing information quickly which heretofore could be transmitted on a more leisurely basis.

(5) INCREASE IN NUMBER OF INFORMATION PROCESSING AGENCIES

The four changes described above have resulted in various agencies undertaking information processing and disseminating functions. These include governmental agencies, professional and trade associations, universities, and profitmaking industries. This trend has led to an unquantifiable overlap in processing and services.

In consequence of these changes, new tools, new communication systems, new means of information organization, and new means of dissemination have been proposed and developed. Each in turn has both helped alleviate the problems, and uncovered new and fundamental problems.

(1) INFLUENCE OF THE COMPUTER

(*a*) *Logical Capabilities*

The use of computers to search indexes to large files based on logical combinations of subjects has led to the trend to increasing depth of analysis of source materials, which in turn has increased the cost of such analysis to the point where few organizations have the wherewithal to process for their own use the information that would be of possible use in the future. This has led to centralization of information processing activities, for example, by Government agencies and professional societies, and an attempt to amortize the cost over many users. But centralized services have been imperfect, and decentralized as well as specialized information centers have been developed in an attempt to overcome some of their limitations.

(*b*) *Processing Speed Capabilities*

The speed with which computers can search large files carries with it a consequent high cost. In an attempt to amortize this cost over many users, there has been a trend to utilize the batch processing capabilities of computers to handle as many questions as possible at one time. But the consequences of this trend is a decrease in effective speed of search, since time elapses while a sufficient quantity of search requests are accumulated. This has led to consideration of how time-sharing computers may be utilized to provide search results in real time. The processing speed of computers has also led to consideration of how whole texts may be searched to advantage. But this consideration brings up the problem of whether algorithms can be developed which apply the test of significance of information as opposed to mere identification of words that may appear in a given text.

(2) INFLUENCE OF COMMUNICATION SYSTEMS

Modern communication technology offers the opportunity to transmit information in the form of data, voice, and images. Theoretically, this technology would permit the information resources of all organizations to be shared by permitting remote inquiry through an appropriate network mechanism. The availability of time-sharing computer system with their ability to tie into network systems makes it possible to contemplate an inquirer sitting at a remote console interacting with a multiplicity of information resources in real time. However, in considering how to translate theory into practice, it becomes obvious that fundamental knowledge is lacking with regard to the following questions:

(*a*) How can the differing philosophies of analysis of source materials and differing means of vocabulary control be rationalized when several resources are to be exploited to serve a single inquiry?

(*b*) What criteria would inquirers use in judging relevance of information provided in an interactive mode when networking systems employing modern communication technology are used?

(*c*) What will the behavior of an inquirer be if he has the opportunity to conduct information searches personally through a console? What training problems will be involved? What programs need be written to provide an adequate conversational mode in this regard?

(3) INFLUENCE OF NEW MEANS OF INFORMATION ORGANIZATION

The pressures for greater and greater penetration into the subject matter of source materials have been evident as the quantity of published information has reached the point when traditional classifying and indexing methods are not able to provide literature search results with the precision, relevance, and limitations being demanded. In other words, the requirement for precise specification of problems and questions of inquirers has led to consideration of corresponding means for precise specification of the subject matter of the source materials. This consideration has led to increased pressure for subject analysis expertise which approaches the expertise of the inquirer. On the other hand, the personnel requirements for processing the increasing quantity of source materials have not been matched by available skilled manpower. Consequently, alternative methods of processing have been considered, proceeding successively through the use of:

(*a*) Generalists rather than specialists; and

(*b*) Automatic means for analysis of information, involving either portions or the entire text of the source materials.

Study of the results of application of both of these methods indicates that imprecision and inconsistency in analysis is not avoided, leading to uncertainty in the exploitation of large files. Accordingly, other means have been sought to overcome the consequences of this uncertainty. Explorations have resulted in the development of various vocabulary control and search strategy techniques. Testing and evaluation of these techniques has become a matter of increasing attention, leading to the identification of increasingly fundamental problems relating to:

(*a*) The nature of information transfer from source materials to the inquirer;

(*b*) The criteria for relevance judgments of inquirers, and their dependence on incremental learning;

(*c*) The nature of concept formation; and, most basic of all,

(*d*) The learning and thinking processes.

(4) INFLUENCES OF NEW MEANS OF DISSEMINATION OF INFORMATION

It has been interesting to observe the development of means for dissemination of information in such a manner as to correspond selectively to the profile of interests of inquirers, thus keeping them informed periodically of published materials in the precise areas of their professional work. However, the changing interests of many inquirers requires that careful attention be paid to means for obtaining feedback which permits dynamic response to indications of changes, or even saturation of interests. The need for development of means for observing inquirer behavior without undue interference with normal work habits has led to consideration of the methodology of the behavioral sciences. But this methodology must take into account the fact that the average information user can spend only minor fractions of his time relating to information services. Accordingly, the mass effects of new dissemination methods can be discerned only with large populations of users, leading to the need for the careful application of statistical methods to discern real effects and their significance.

The foregoing have stimulated consideration of matters relating to the traditional libraries, and the very significant investment that has been made by society in their development and maintenance. Increasing demands for library service, even of a traditional nature, have led to investigations of how the new tools and communication systems might streamline these functions, which despite the growing importance of information storage and dissemination centers, still is the main instrument of society for democratic access to recorded knowledge. Resulting has been the application of computers and other data-processing equipment to the control of circulation records, serial records, and even to the conversion of catalog information to machine-processable form. Initially this latter application was considered for purposes of convenient updating and publication of book catalogs. However, the availability of this information in machine-processable form has led to some effort toward providing real-time access by library users. And attempts have been made to exploit the logical capabilities of the computer for identifying books and monographs in a manner that is analogous to the way in which they are used for information retrieval in depth for documents and published papers. But the paucity of subject headings normally provided during subject cataloging has made this approach unrewarding. So methods are being investigated for more detailed analysis of books and monographs, a problem that is far from trivial.

The advanced communications technology has been exploited in connection with interlibrary loan procedures (the traditional library response to resource-sharing requirements). The location of desired materials has been facilitated by the mechanism of almost real-time communication systems such as teletype. In addition, image-transmission systems are being considered for the provision of copies of materials without physical removal from existing collections.

But the services that are emerging and will develop are much more costly in visible expenditures than traditional activities, and the question must be explored regarding how to market these services, either through filling overt requirements or through stimulating interest that did not exist before. This has not been a trivial problem, since the library function has been considered to be free to society ever since the principle was established by Andrew Carnegie toward the end of the 19th century.

There are also legal implications involved in the application of the new technology in the library and information sciences. The convenience of providing copies of published materials and the accelerating trend toward conservation of storage space through the use of microform brings up consideration of violation of copyright through promiscuous processing, copying, and transmission of such materials. This legal problem, and the related economic problems, is causing concern and investigation of the consequences to various elements of society: The publisher, the authors, and the user public.

B. The Library and Information Center of the Future

1. INTRODUCTION

Information science programs are being designed to respond to the problems incurred by the information explosion by hypothesizing that the library which is to serve future generations is more than bricks and mortar. It will not be useful if it is to be a book warehouse—manned by book keepers. Rather, the library of the future must be created as an organism for performing work, for providing service, and for conducting research. This organism will be responsive to the changing requirements of a dynamic field, with responsibilities in education, in research, and in practice. The most modern and flexible mechanisms will be available for exploiting recorded knowledge in the interests of professional advances.

The director of the library of the future will be a library and information scientist, an educator, and a research director. He will draw about himself a constellation of specialists from a number of professional disciplines.

Some new libraries have been designed modularly (to permit physical expansion); functionally (to facilitate the performance of technical services); reader-oriented (to better serve the client); and librarian-oriented (to convenience the internal staff). The new programs must consider a new need—for a library designed for intellectual growth through research.

The articulation of information science programs is based on the thesis that there is need for access to recorded knowledge that must be satisfied by providing rapidly, conveniently, economically, and with precision, that portion of the current or previous literature that will be useful—

—to a particular individual,
—at a particular time,
—for a particular problem or interest,
—and in a form that is useful to him regardless of,
—where it was generated,
—in what form or language,
—or how it must be located and processed.

The utopian dream is to have information available on the day of publication, neatly translated into one's mother tongue, and packaged in quanta which are of infinitely variable size and content.

The translation of this dream into a program involves changing concepts of information handling. Some of these concepts are discussed in the following:

a. Information as a Physical Commodity

Library materials, including books, periodicals, and reports, have traditionally been stored physically on shelves and selected on a custom basis, either by library staff or by the reader. In more modern terms, the significant amounts of library materials to be moved into and out of storage can be considered from an industrial engineering point of view as:

(1) A warehousing and materials handling problem, with selection, delivery, and return to storage conducted mechanically;

(2) A manufacturing problem, with materials stored in microform, and access provided locally and to distant locations through:

(*a*) Provision of returnable copies by mail or other physical means of transfer;

(*b*) Provision of disposable copies by mail, or by telecommunications techniques;

(*c*) Transmission of materials by means of television techniques with option of preparation of copies locally from the face of cathode ray tubes; and

(*d*) Stocking of subwarehouses with microform copies and providing access to information via mail or telecommunication media.

b. Information Retrieval as a Data-Processing Problem

The available stockpile of information can be considered in modern terms as a data-processing problem, with various types of equipment available for manipulating indexes to the physical storehouse of information from a multidimensional point of view. By this is meant that source documents may be characterized from more than one point of view and also identified for delivery by combining more than one aspect of subject matter—by applying clerical, mechanical, or electronic means to perform selecting and correlating operations.

c. Information Retrieval as an Intellectual Problem

In traditional terms, the library activity has been an art, with analysis of documents and reference services considered to be techniques which are learned through apprenticeship after suitable training. However, the greater demands being placed on the library have resulted in the realization that specialists in other fields can make a significant contribution to the intellectual problems facing the field. Accordingly, there has been an infusion of linguists, logicians, mathematicians, electronic engineers, psychologists, and other specialists who have been considering means for the solution of theoretical and practical questions that are encountered in communicating via the written record. These specialists have been deeply involved in the forward research work leading to the development of more sophisticated automatic information retrieval systems.

d. The Library in Terms of Technical Processes

A library represents different things to different people. To many library staff members, the library consists of a number of technical processes involving: Selection of books, periodicals, or other materials; ordering of materials; binding; cataloging; copying; etc. These technical processes can be considered from an engineering point of view as unit operations, which are conducted in a production environment, with modern business methods being applied to carry them out and to keep track of them. Various methods of automation are now being considered for each technical process of the traditional techniques and for many of the unit operations newly identified in more modern approaches.

2. DEVELOPMENT OF CAMPUS-BASED INFORMATION SYSTEMS

The scholarly community is becoming increasingly aware of its information environment. This awareness has been stimulated by a number of factors, not the least of which is the increasing realization that keeping up to date through reading the book and periodical literature in its classical form is becoming less and less convenient as the scope of interest of scholars becomes increasingly interdisciplinary and the quantity of literature of potential relevance becomes greater.

Communication among scholars through personal contacts, although increasing dramatically, is not likely to provide assurance that even the most fruitful contacts can be assured in a timely way through serendipitous discovery of communities of interests.

An impressive array of centralized and specialized information services, both discipline- and mission-oriented, are available, under development, or being planned. It has been hypothesized that these services will be augmenting or, in some cases, replacing the traditional library services that have been used by scholars in many or even most fields of endeavor. But exploitation of each of these new services, many computer-based, involve overt expenditures of funds which, in a university, may often equal and, sometimes, exceed the budgets for purchases of books and other materials of the library system. These overt expenditures, when multiplied by the number of services that are now, and may soon be available present a budget dilemma that has not often been contemplated seriously by university administrations.

It is not enough to say that funds are not available to support these new services that will be demanded by the scholarly community. Rather, like the conclusion reached in contemplating increasing budgets for conventional libraries, that some academic programs cannot be maintained without ready access to adequate library collections, so it may be said for these new services that some programs should be excluded from the curriculum if ready access to these new services cannot likewise be assured.

Nor is it enough to rely on grant support to establish campus-based information centers, since interest in services from these centers stimulated during the grant period will have to be satisfied following the period of sponsored development.

Rather it is necessary to predict the dimensions of the information problem: to design an information system which not only brings replicas of files to the campus but also provides remote access to other files when it is more convenient or economical to do so, and to develop plans for financing the operation of the system.

In developing such plans, the starting premise must be that faculty and students are to be provided with the most effective secondary information services that may be technologically feasible. It is known that any given educational institution will never be able to create such services *de nova* and that each would always wish to interrelate, on some basis or other, with many discipline- or mission-oriented services. This relationship would involve acquisition of, or remote access to, search-ready files, mostly involving the use of computers for exploitation purposes.

It is assumed that the costs of providing such service at the level and frequency desired will eventually exceed the ability of the institution to cover such costs when the expected lease, royalty, capital, and operating expenses are all taken into account, once the period of sponsored research has passed. Accordingly, a basis for amortizing basic operating costs over a group of users larger than any single educational institution must be sought.

Accordingly, successive expansion of the base of users must be considered so that resource-sharing economies may be achieved.

But, it has become obvious that many, or most, organizations are not willing to pay the full costs of obtaining services unless a one-stop service is offered. That is, assurance is demanded that the services to users are based on exploitation of all of the resources relevant to a give interest.

It is entirely reasonable for fee-paying users of information services to demand such assurance, since otherwise other sources would have to be exploited by the users independently, with attendant substantial fees, but without obviating uncertainty as to the extent of overlap in coverage among the services exploited.

This situation provides an additional incentive to the educational institution to interrelate with as many services as are willing and able to provide access to their data bases for purposes of local or regional exploitation.

C. INFORMATION SCIENCE AND LEARNING

Discussions of the information explosion and its consequences have emphasized primarily the increasing difficulty of any professional being able to read all of the published literature that is of interest and of consequence. This situation has led to a trend toward increasing specialization in an attempt to reduce the amount of information that must be assimilated by any individual to manageable proportions.

It comes as no surprise that this trend toward specialization has led to increasing difficulties in communication among specialists. Furthermore, the specialist, when he must exploit literature peripheral to his specialty, finds it more and more difficult to use traditional library facilities to penetrate the subject matter and to obtain information relevant to his requirements.

This problem has provided impetus to the development of information storage and retrieval systems, involving the use of nontraditional techniques and devices, particularly computers.

However, there is another matter that may not be as evident that is related to the knowledge explosion problem. One of the consequences of information overload has been, and continues to be, increasing emphasis on teaching of principles rather than facts, at all levels of the education continuum. This shift in emphasis does not relieve the student from the burden of being able to locate facts which may be needed during his educational experience and later, which relate to the principles he has learned, and which can be related to the intellectual framework of the subject matter that a student has acquired. This implies an increasing burden on libraries and information retrieval activities to permit ready identification of information on demand.

The problem is complicated by another factor relating to this shift in emphasis. When certain information has not been provided to a student during his educational experience, questions directed to the library or information center are no longer based on a "recall" function, since the student may never have been exposed to the information which he wished to locate. Rather, questions are now derived from the student's knowledge of principles, leading to the identification of characteristics of the desired information rather than the information itself. This change in the nature of question-asking leads to the requirement that information stored for later retrieval must be analyzed in sufficient depth so that this new type of question can be asked with some confidence in effective searches being performed.

More and more, then, learning and information retrieval become interrelated as the information explosion develops further, with an increasing requirement that students be taught how to exploit effectively the libraries of the past and the information centers of the future. How to infuse into the educational experience a thorough knowledge of the library and information sciences of the future, is a challenge that must now be faced.

The increasing availability of time-sharing computer facilities has made it possible to consider the development of conversational programs which provide instruction regarding formulation of strategies for exploiting computer-processable files. Although several such efforts are now underway, the programs are still untested and not generally available. However, it may be anticipated that as these programs become increasingly available, there will be stimulated a demand for on-line files, so that searches may be performed by an individual through a console following successful negotiation of a search strategy. This, in turn, would lead to demand for provision of images of printed materials via a console, presenting a requirement for image transmission capabilities from remote locations.

D. MEDIA IMPLICATIONS

From the foregoing, it may be obvious that there has been a shift in media involved in the library and information science field, with regard to: (1) generation and storage of records; (2) inquiry; and (3) response to inquiries.

(1) GENERATION AND STORAGE OF INFORMATION

Traditionally, the printed page has been the primary medium for storage of information. Although this medium will probably continue to handle the bulk of storage requirements, other media are being used increasingly including: film (including microform); magnetic tapes; and discs.

(2) INQUIRY

Reference to information-locating tools has traditionally been dependent on printed records, e.g., catalog cards, and printed indexes. However, it may be expected that increasing use will be made of consoles, which permit direct inquiry via other media, such as keyboard inputs to computer-based files or cathode ray tube displays which permit formulation of requests based on light pen selections from available alternatives.

(3) RESPONSE TO INQUIRIES

Traditionally, delivery of materials in response to inquiries has used the medium of hard copy. Now, the opportunity presents itself to display images via consoles with an option to produce hard copy locally. Also, for materials stored in an audio medium, audible signals may be transmitted in response to an inquiry.

The technology that permits communication systems to handle these media has been developed to the point where it is possible to demonstrate the efficacy of such approaches. However, the economic impact of such technology seems, on the surface, to be destructive. Nevertheless, network development to permit the provision of data, voice, and image transmission capabilities is contemplated as the way to share costs (as well as information resources), so that given full loading of the proposed and developing systems, the cost of each use should be well with plausible limits.

The development of a telephone network, which has illustrated this principle, provides hope that media of various sorts can be handled efficiently and economically.

THE NEW MEDIA AND OUR TOTAL SOCIETY

BY NELSON N. FOOTE

The impact of printing on society was infinite in its ramifications, which are still continuing. Viewed comprehensively, however, they can be summarized as enhancing the importance of the individual while widening the world of which he is a part.

The impact of electronic communication of information on society is likewise infinite in its ramifications, which are only beginning. Viewed comprehensively, they also can be summarized as still further enhancing the importance of the individual while immensely widening the world of which he is a part. Hence, these two major turning points in human history deserve comparison.

On the other hand, there are differences so drastic between printing and electronics that one may wonder if their consequences could possibly move in similar directions. Marshall McLuhan, for example, contends that whereas printing led to cultural explosion—movement outward from the centers of civilization to unknown realms, electronic communication is leading to cultural implosion—the unification of society and of knowledge itself into a single commonwealth. Our thesis shall be that, notwithstanding the dramatic contrasts between the older and newer media, the effects of both on society are to elevate the individual and widen his world. The direction of development is similar, but of course contemporary exaltation of self-consciousness and of global awareness differs in kind and degree from what began half a millennium ago. Thus, contrasts between the older and newer media and their characteristic impacts must be explored before our thesis can be confirmed.

Before writing and reading, there were no media of communication. Before printing, there were no mass media. Any medium is both a help and a hindrance to communication. In the tiny, preliterate tribe familiar to anthropoligsts, all communication is direct and immediate among those within earshot and eyeshot of each other. It does not extend beyond these in space, and only meagerly in time. Knowledge—being imparted orally and hence subject to continued errors cannot accumulate beyond the limited amount which the old can remember and tell the young. Hence the growth of culture has heretofore seemed to depend on the development of writing and reading. No one questions the gain, but that literacy can also be an impediment only emerges from reflection.

Problems of Writing and Reading

With the coming of electronic media of communication, literacy is no longer a requisite for communication beyond the present audience. The endless consequences of this simple fact for education and for world civilization are becoming apparent more rapidly than did the consequences of the invention of printing.

Education—even before the invention of printing—has been identified with books. It has largely been conceived as the deliberate transmission of already existing knowledge, which has been recorded and stored in books. Learning to read—the *sine qua non* of the first grade of school—has therefore in every generation had to precede acquisition of the knowledge stored in books or other printed media of communication.

Fundamentally, writing is a means of transforming auditory information into visual information; reading, the process of transforming it back again. Learning to read is an arduous, lengthy and expensive process. Hence, it is not remarkable that most of mankind remains illiterate to this day. Neither is it remarkable, on the other hand, that most of mankind should aspire to literacy as the key for unlocking the treasury of accumulated knowledge.

Not only is the ability to read and write a laborious achievement, but the transformation of auditory information into print and back again entails several other impediments to the carriage of information over space and time. The writing and printing of messages require time and money, paper and ink, presses and postal service, not to mention the centuries required for invention of pictographs, hieroglyphs, alphabets, musical notation, and other means of signifying sound.

If communication over space and time had been possible without it, writing might never have been invented. The major initial reason why mankind has ever inclined to put words to paper (or metal or stone or wood) has been to transmit messages to audiences absent in time or space. To write a message to another person in his presence may occur and may perform auxiliary functions, such as maintaining secrecy of the message from third parties, but for immediate communication writing could hardly be considered superior to speech.

The auxiliary functions of writing, once it has been learned, however, accrue considerable value. Writing thoughts down may assist, for example, in their clarification to the writer. As James Reston said during the recent long strike of the New York Times. "How can a man know what he thinks unless he can read what he writes?" Recording may impress events or observations more firmly in the mind of the reader, and will obviously preserve memories more securely and accurately than the human organism can. An organized array of knowledge on paper provides more scope and perspective across a mass of items than the mind unaided can grasp simultaneously. Thus, as in the development of other phases of culture, writing has accrued various functions beyond its original task of communication at a distance. Nonetheless, it can be described at best as an inefficient method for recording, storing, transmitting, and reproducing information. None of its functions or values need be sacrificed in adopting more efficient means for accomplishing them. Conservatives will cringe, but writing may someday—like armies and navies—be only a relic of the primitive present.

CONSERVATISM OF WRITING AND MESSAGES

It is characteristic of written messages that, being read at another time or another place, they are not replied to immediately, if at all. Indeed, the greater mass of printed matter is not intended to be replied to by its readers. This unilateral characteristic of printed matter is in practice shared by some of the newer electronic media, as in broadcasting, but electronic communication is not intrinsically unilateral. Instead of *communication*, the transmission of messages to which no reply is intended or possible might usefully be distinguished as *munication*. To transmit information to absent audiences, possibly unknown, is thus a mental and cultural feat largely dependent hitherto on the development of printed media.

It has long been observed that for many people any information that is printed carries an aura of authority; it cannot be argued with, only accepted or rejected. Books whose authors are long dead seem in particular to engender vague claims to superiority in some minds. On the other hand, from this basic sense that what is written is detached from particular audiences has also come a traditional root metaphor of science, the underlying assumption that true knowledge as an entity exists independently of listeners or readers who accept it. The legend of the Alexandrine library, in which Greek culture was preserved until the Enlightenment, exemplifies this fundamental concept of recorded knowledge divorced from both its authors and centuries of intervening audiences. Old phonograph records of songs by Caruso likewise evoke a mortality defying sense of the potential permanence of human performances deserving immortality.

Most human beings are taught—from infancy onward, by thousands of admonitions, acts of protection, and expressions of care—to avoid injury and death. Out of these countless tiny incidents is fashioned the powerful instinct to go on living, which they come to regard as born within them, and from which their universal hankering for immortality is elaborated. Groping for means of expressing this desire with more confidence than can be obtained from merely inscribing their names on stones, some men come upon fame. A man then wishes for his name to be spread throughout the earth, for his picture to be recognized anywhere, for the books of history to retell the story of his actions to succeeding ages. An alternative to being written about is to do the writing, not anonymously as in recording simple matters of fact, but with full display of cherished idiosyncrasy. In the past, men with a powerful drive for fame had to be content with the book as apotheosis of self. But now, with electronic media for recording, transmitting, and reproducing, it is plain that for future generations not even the writings of Winston Churchill about himself will compare with the recorded sight and sound of his addresses to Parliament during the Battle of Britain. Hence, instead of taking away any of the conservative functions and values of books and writing, the electronic media may have enriched them.

To the extent that education is viewed primarily as the transferring of information from one generation to the next, or from those who possess knowledge to those who do not, education is a special case of munication in general. If education were only the imparting of information, however, we might wonder why schools did not disappear with the invention of printing, or were not reduced to the mere teaching of reading.

Before printing, it might have been supposed that schools existed primarily for the sake of efficiency in teaching: one teacher could instruct many students simultaneously. Presumably schools and teachers perform functions other than the imparting of information, since they did not merely survive but flourished after the invention of printing. They will similarly survive and flourish in the future. Far from being displaced by the electronic media, the performance of their various functions, including the imparting of information, will almost certainly develop further. But to understand just how this outcome can recur, as it did in response to printing, requires some analysis of the many kinds of communication that occur in schools, between teachers and students, and among students, in addition to the simple imparting of information.

THE ROLE OF THE TEACHER IN LEARNING

The first effect of a teacher on a student normally is to define what is to be studied, that is, the curriculum. Recognition of anyone as a teacher implies that he possesses not merely the knowledge he imparts but more: that he encompasses sufficient acquaintance with the field of study to select wisely which portions are appropriate for the student before him. This role of guiding the sequence and content of learning is extremely powerful in determining the consequences of education, and hence is always at issue. It may be played, however, in many ways: from dictator to editor to adviser to curator.

In all these ways of influencing what knowledge will be acquired by the learner the image of the teacher as transmitter is evident, however selectively the content is adopted to the learner. In adapting content to the learner, however, the art of assessing just when which learner is ready for which content can be elaborated to unlimited degree. Hence, teaching depends as much on the teacher's understanding the particular nature of the learner as on possessing the knowledge to be transmitted. Here is where face-to-face interaction between teacher and student has hitherto seemed indispensable.

The study of the individual student by the teacher is neither widely nor intensively practiced in schools of any kind. Ironically, it is explicitly recognized and honored most where it is probably needed least, in primary schools, where children are in fact less differentiated from each other in their development than at any later period of their lives. In general, students tend to be classified into groups roughly corresponding with age, the members of which are homogeneous enough to justify exposing them simultaneously to the same selections of knowledge. Any further adaptation of content to match the unique qualities of individuals tends to occur without plan during the interaction of student with teacher or with other students. Yet in the art of matching content with learner over time lies most of the raison d'être of teaching.

Although not widely practiced in schools, some very advanced examples of elaboration of the role of the teacher as a guide in personal development exist. The best known of these examples is coaching in any field of artistic or athletic performance. Here the emphasis, after the acquisition of basic technique, is no longer on the imparting of knowledge but on the improvement by practice in its use. The coach may or may not serve as a model for the student. His own proficiency in the art may be of value in motivating the student to emulate him, but does not seem indispensable, and is rarely sufficient.

A good coach exposes his pupil to many models of excellent performance, enabling him to recognize their differing merits. But what the coach does that is indispensable is to enable the learner finally to appraise his own performance, even during the act of performing, thereby endowing him with greater power to achieve the intended result than would otherwise be possible.

The role of the coach is complex, involving many ways of criticizing and stimulating the performance of the pupil. There is no one best way of playing it; there are probably many successful ways, both with the same learner and with other learners. Perhaps one virtue of a good coach is that he knows whom he can coach best, and under what circumstances. Coaching by definition takes account of the peculiar capabilities of the learner and the peculiar timing and other conditions of their unfolding. It thus seems difficult to generalize about how to coach, other than in the loose sense of stating the objectives. Coaching itself, in other words, is an art like any art to which it is applied. There is, however, one objective of coaching in which the electronic media offer unique assistance.

ELECTRONICS ENABLE SELF-COACHING

By its nature, the human organism cannot both perform an action and witness this action simultaneously, even with the aid of a mirror. It can at best flicker rapidly back and forth between action and perception of its own action. During moments of intense concentration on difficult action, it is especially oblivious of itself as an object. Yet its precisely these moments—the heights of performance in any sphere of activity—that are especially prized by both actor and audience. How then is the coach to convey to a pupil just what is going on at those moments? Here is where words often fail as a means for reflecting back to a performer fuller awareness of his own performance. And here is precisely where the movie camera and the tape recorder have already been eagerly pressed into service to supplement the memory and descriptive ability of the coach. Eventually these two devices will be fully integrated by their inventors in a form available for mass use. As yet they have not been. The sound movie is awkward and expensive, and cannot play back instantly what has happened during a practice session. The cheapest available video recorder so far announced is still financially out of reach of the ordinary individual and of most schools, although it has been in use in broadcasting for several years. Well before the end of the century, however, people will be able to observe themselves in full color and sound immediately following any performance. And in thus having available an inclusive audiovisual record of behavior, they will be able to derive more value from coaching, to learn faster and better how to shape their own performances--hence, finally become independent of coaching—than ever before.

Instead of attending schools and waiting in turn for limited attention from coaches on the staff, they may thus be able to receive coaching at a distance—e.g., by mail—from superior coaches, who can schedule their coaching with greater efficiency, and possibly with greater effect.

Electronics May Enable Self-Appraisal

Coming back to conventional education in the schools at present, the model of the teacher as coach can help in analyzing some other potential applications of electronic media to the processes of learning and teaching, and to the teaching of learning and the learning of teaching. To the development of a truly interactional theory of these reciprocal processes, the so-called teaching machines have only begun to make their contribution. Essentially the teaching machines all operate by breaking down certain definite types of knowledge into small bits; these are presented in accumulative sequence to a learner, who is obliged to reproduce them as he acquires them; his progress in learning at each step is instantly confirmed, or his failure to learn is disclosed, so that he is either encouraged to proceed to the next bit or to go back and relearn the previous bit correctly. What is at once evident about the teaching-machine procedure is that its function is to transmit information which is regarded as learned when it can be correctly reproduced.

The teaching machine is not cognizant of special characteristics of the pupil using it. To be sure, he may proceed through the program at his own pace. But the programs of instruction being composed for use in teaching machines apparently aim—insofar as their creators visualize an audience or class of students at all—at a highly generalized human being. He must of course be literate; all the programs in existence so far, require reading (but not writing). If there is to be some selection of content relative to the requirements of particular users, it must be either by students themselves, or by a teacher of conventional type who still retains this function. And obviously the teaching machines as presently conceived attempts none of the functions of the teacher as coach.

Yet why not? Instead of merely disclosing the correct answer after the learner has proffered his, why could not a machine be devised which goes beyond indicating that a mistake was made, to helping the learner discover the specific nature of the mistake? The incorrect answer is the result of something wrong in the process of attention, observation, or cognition that preceded its production. Moreover, there may be several ways of producing the same mistake. Microscopic examination and reexamination of the performance which produces the characteristic mistakes may thus actually give an advantage to the learner in identifying his mistakes by himself, since he alone knows their subjective sides.

Learning the touch method of typing represents a task in acquiring definite knowledge which is amenable to the kind of conditioning employed by teaching machines. The good teacher of typing, however, does not merely point out mistaken copy to the pupil, but endeavors to understand the mistakes in performance which produced the mistaken results. Having identified the characteristic (as against random) mistakes, the pupil is instructed to practice his mistakes, that is, to repeat carefully those items which are particularly likely to be misperformed by him. By direct observation and discussion with the pupil, plus the wisdom drawn from experience with other makers of similar mistakes, the teacher may ferret out the source of the recurrent failure, and thence act to correct it—if it is correctable. From observing the teacher go through this process of diagnosis of the origins of mistakes, and the subsequent correction, the pupil is thus enabled to diagnose and correct his own failures in performance. That is, he becomes independent of the teacher, not when he has learned to type perfectly, but when he has, through taking the role of the teacher toward himself, become his own further teacher. In view of the basic simplicity of the typing problem itself, and the potential ease of audio-visually recording the typing performance, it seems feasible to invent a series of questions which could be put by a machine to a pupil about the origins of mistakes in his own performance, to supplement or implement microscopic review of performance. The limitations of the present teaching machine, in other words, reflect more the shortcomings of the educational psychology on which it is based than of available mechanical or electronic technology. Both sets of shortcomings, however, once recognized, can to some extent be corrected, but schools, teachers, and fellow pupils will undoubtedy remain and may even multiply in the future as a further effect of electronic media of communication.

The Role of Others in Learning

Just as the teaching machine omits most functions of the teacher in learning, it also omits the functions of fellow pupils. Apart from the building and its furniture, a school has always seemed to include not only books and teachers, but fellow pupils of the learner. The economy of subjecting numerous pupils to the custody of a single teacher, as against leaving education to parents, is obvious. This is, however, not merely an instance of the efficiency of the division of labor, important though such division may be to the professionalization of teaching. In explaining the survival of schools after the advent of printing the function of fellow pupils in facilitating learning by the individual is at least as important as that of the teacher.

It might be supposed that what other pupils furnish to a learner is simply supplementary to what the teacher furnishes. Older children often teach younger, but it is more important to observe that most, if not all, learning is accompanied with continual reference by the learner to what comparable learners are doing. Such interest seems intrinsic to the learning process, possibly congenital in the species. Animal trainers find that their beasts and birds learn much faster in the company of others, especially those that have already acquired the training that is expected. Few readers would hesitate to apply this analogy to humans. That the presence of others facilitates learning, however, deserves evidence drawn from human behavior.

There are mingled elements of competition and cooperation in this process of continual reference to others. Each human learner seems almost instinctively to match himself with other learners of more or less equal capacity and preparation. Of course among children these tend to be others of their own ages and local origins. Because of the usual differences in their ages, siblings are rarely well-matched peers in learning, so they have to find peers outside their own families. This choosing of comparable learners goes on spontaneously, and is in fact such a powerful tendency that it resists deliberate efforts to extinguish it. Fortunately, the system of grades in American schools accomplishes a crude approximation to such matching. Once schools become large enough, through the growth of population and urbanization, the potentiality exists for refinement of the grading system. So far, however, we have not progressed very far beyond the great reform of introducing eight grades into the one-room schoolhouse of a rural community: Now there are twelve grades, but sophisticated experimentation with a view to employing the principles of matching in the facilitation of learning is still rare.

In sports and games, where the sociology of competition is highly developed, matching and handicapping are practiced with great precision by officials. It is also recognized that success in motivating superior performance is dependent on just such precision. When individuals or teams are pitted against inferiors, they become bored and negligent in their performance; when confronted with complete superiors, their motivation suffers equally, from pessimism and discouragement. It is only when resources are equal, and uncertainty as to the outcome depends to a large degree on mobilization of effort, that such effort is abundantly forthcoming. One sometimes wonders how educational theorists could ignore so long the lessons of motivation portrayed by the contrasts between behavior of the same pupils on the playground and in the classroom.

Not everything that looks like competition, however, is actually competition; much of it is emulation. One hopes eventually to equal and surpass his competitor. To do so, he is aided by intensive observation of the other's performance. He tries to acquire decisive advantages in technique, while avoiding disadvantages. With the same aim, he also studies his own performance, ideally with the aid of a perceptive coach who is also skilled in communication. The zest and delight of competition, as the wisdom of experienced players has attested, spring as much from the exercise of highly developed facility as from the fact of winning. Hence, sports as a human activity represent an elaborate system of cooperation in the maintenance of rules whereby performance is optimized through fair competition. These rules, it should be added, are created and changed by the players, who immediately discern when some previous rule is no longer working to accomplish the objectives of fair and intense competition among equals.

In theory, the system of examinations is a means of measuring absolute proficiency; in practice, it is almost completely relative, that is, it mainly ranks pupils in relation to each other. This observation testifies to the implicit influence of the presence of others on the process of learning. Many teachers accustomed to the present system, if presented with a single pupil and asked to evaluate his performance, would be hard put to do so without reference to the performance of other students.

On the other hand, there are some teachers and theorists who would deprive learners of all benefit of comparison with their fellow pupils. They discover, of course, that the curiosity of their pupils finds ways to outwit them—to find out the marks of others, for example, or to communicate with each other their own evaluations, which may or may not coincide with the teacher's.

Appraisal of each other's performance is such a powerful and irrepressible feature of most if not all learning that it can be found in all human activity, not merely education. With so many years of life being spent in schooling in American society, the formal methods used in educational institutions also influence other institutions. Evaluations of performance in employment by personnel officers, for example, are often indistinguishable from records kept by school officials. While in industry and commerce the vogue of tests and testing has spread quite widely, it encounters far more resistance and criticism than is common in school systems—and also far more exceptions and evasions, even where officially promulgated.

Numerous other functions emerge from the process of matching by which learning is facilitated initially by fellow-learners. In schools, the system of grading is also a system of pacing. As a framework for scheduling the sequence and duration of the various components of the curriculum, the pace at which all members of a class can keep up with the others will always limit the pace of teaching, short of the point at which each class consists of a single individual. This pacing in turn creates a structure of discipline. In keeping pace with the others, assuming this pace is within his capacity, the learner is governed not only by the commands of the teacher, but by the less formal but often more potent expectations of the others.

Discipline in the working place, as observed repeatedly by sociologists, at least in the sense of rate of productions and quality of product, is governed more effectively by the norms of the group than by the demands of supervision. While now and then some highly autonomous individual may exceed the pace of the group and be brought back down to it by their sanctions, and another may be highly productive without benefit of some group standard of comparison, in general it appears to be nearly universal that discipline in this sense is virtually indispensable to productivity. The quantity of effort that is expended in tasks of long duration is far greater than when it is accomplished on a regular schedule, enforced by the expectations and legitimate sanctions of others, than where it depends on the spontaneous volition of the undisciplined individual. Any parent who has ever instructed his own child in almost anything has discovered the value not only of regularity but of involving other children. Similarly, for adult learning regular meetings with a definite program for accomplishment—a definable beginning, middle and ending—are almost the *sine qua non* of all but superficial and sporadic gestures of learning. The field of adult education is sometimes hampered by lack of this kind of discipline. When members of adult education groups become serious about a common objective, however, they are as ready as their teachers to impose such discipline.

These examples of the functions of peers in learning may suffice to demonstrate that neither teaching machines nor any of the other media considered here can take the place of teachers or of fellow-pupils, although electronic reproduction of information might well and usefully take the place of books and printing. The teaching machine in particular, as further experience with it is rapidly disclosing, possesses the defects of its virtues. The boredom it engenders after the first exciting phase of involvement is already widely commented on. The need for teachers and fellow-pupils who can furnish the motivation and discipline for using programed instruction effectively is now apparent, not least to it serious advocates, who are taking pains to temper some excessive claims of early enthusiasts. The same moderate assessment of their contributions will also apply in observing the evolution of the electronic media.

That the electronic media will no more obviate schools than did printing may seem neither an original nor a very interesting observation. The electronic media are appearing on the scene, however, just when education is expanding beyond the schools to encompass the adult years, and when the need for recurrent retraining, as a consequence of obsolescence of previous knowledge and skill, is being satisfied by many other institutions for their own personnel. Thus these new media will influence society at large not only through the schools but through all these other institutions as well. Indeed, these other institutions often seem more avid to apply advanced technology in their internal educational activity than do the conventional schools. Thus it may be that the principal impact of the newer media on society at large will be less through the schools than through corporations, government agencies, professional societies, and commercial organizations. Schools will not be obviated, but may thereby be reduced to secondary importance in the total picture of education.

It could be argued that by the time he becomes an adult, a person can dispense with teachers, through becoming his own guide in what to study and his own coach through electronic self-observation. Once the role of others in motivating learning is fully taken into account, however, it is harder to argue that fellow-pupils become less valuable as the person grows older. The value of the electronic media in respect to fellow-pupils is thus not in obviating them, but in making them more available. That is, the newer media assist in bringing anyone into fuller and more frequent communication with those peers who must closely match himself, who are experiencing similar developmental tasks at the same time.

An excellent example of this pattern of evolution is the growth of specialized professional societies, which bring intellectual peers together in conferences. Some specialities are so abstruse that an international conference of their practitioners assembles only a dozen people. International conferences are so expensive and awkward as to be rarities in the careers of most; hence, cheaper and easier conversation without travel—in place of correspondence and publication—will greatly facilitate such meetings of minds. A far more widespread example of electronic facilitation of communication is the conference call which permits group conversation among teenagers who are notoriously avid for the company of peers. Teenagers, not only in America, but in most countries of the world have taken to lengthy group conversations by telephone as rapidly and comfortably as if it were a medium provided by nature. (Although the telephone was invented in the nineteenth century, it deserves inclusion among the newer media, not only for the technical reason that it is thoroughly electronic, but because of its instantaneity and all the other features it shares with radio, television, tape recorder, computer, and comsat.) Any instrument which increases the speed and range of communication thus can be seen, through these and other readily-summoned examples, to furnish the developing individual with a larger and more closely sympathetic body of peers. The paradoxical dual impact of the newer media on society—the simultaneous heightening of the importance of the individual and of the international audience—can in turn be seen as in fact a single process: Heightened availability of communication necessitates heightened selectivity, and the development of standards for selection of experience is virtually synonymous with the development of the individual.

FROM SCARCITY TO SELECTIVITY

Quantitative effects of technical improvements often have qualitative effects for individuals, which in turn are reflected as vast social and cultural changes far removed from the original technical changes. Printing increased the availability of knowledge to the common man, and thereby released a train of effects far removed from technology. Printing is often evaluated by historians, for example, as a major factor in causing the Protestant Reformation in Europe, because it put the Bible into the hands of every man who wished to ponder his own interpretation of its meaning and application. Television likewise has brought interviews with statesmen into every living room, where their answers are subjected to the critical scrutiny of millions. On topics of current interest pupils may thereby possess as much information as their teachers and be less receptive to their teachers' views. In sheer accessibility, knowledge keeps moving from the status of monopoly toward that of commonwealth. Restrictions on its possession become by contrast more and more the results of rate and extent of learning, rather than of accessibility; the role of the teacher, less that of dispensing knowledge than of stimulating its appropriation.

The leveling of limitations on the acquisition of knowledge magnifies problems of choice for the consumer. He must decide what is most worth knowing. Since life is too short for him to learn everything, he must judge what is most valuable to him in particular. The only justifiable standardized educational curriculum in this sense contains only those kinds of knowledge which are necessary to the process of learning itself, plus perhaps those concerned with the duties of citizenship—which are in a sense tools also, for living together in an interdependent world possessing a vast commonwealth of knowledge.

From the standpoint of the individual, his need for stricter evaluation of the knowledge he should spend his time in learning does not necessarily mean comfort, although it is immensely preferable to cultural poverty. As in the spectacle of the nouveaux riches, who at first buy indiscriminately everything that appeals to their fancy, those exposed to a bigger treasury of knowledge than they can assimilate often try first to increase their rate of intake. Courses in rapid reading, resort to abstracts, condensations and bibliographies, subjective struggles to keep up with the literature—these are efforts to raise digestion to the level of the appetite. But like the freshman in college who learns that he must forego most of the courses in the catalog, however attractive, one eventually learns that one must discipline oneself to be selective according to self-conscious standards. Otherwise intake of knowledge will be neither appropriate nor proportionate to the uses for which it is sought.

The effect of millions of learners seeking to identify the knowledge most suitable to their purposes has wide range of institutional consequences. These include the development of multiple reference schemes, aids in selection, and more efficient storage devices:

1. The vast array of conventional library reference guides, catalogs, indexes, bibliographies, directories, abstracts, and filing systems.

2. Critical reviews: book reviews, annual reviews of published articles, periodical columns, prizes and citations, even textbooks themthemselves.

3. Labor-saving and space-saving devices: microfilm, encyclopedias, operations research for putting most-used materials nearest at hand; computerization of bibliographical searches.

It used to be that a library was judged primarily by its size, the sheer number of volumes it contained being the measure usually cited. While the breadth and depth of its resources remain important, the value of a large modern library today is often limited, not by lack of adequate coverage of a subject, but by difficulty in using these resources. The availability of knowledge is self-expanding. The expansion of the literate classes has led to the expansion of the production of literature of every kind, through schools and scholars, scientists and laboratories, the arts, and all the newer media for their recording and reproduction. The World's Fair project director of the American Library Association now envisages an electronic hookup of all major libraries in a single system for instantaneous exchange of knowledge, whereby each could in the future offer resources of knowledge much greater than now enjoyed even by the Library of Congress. What this means is that the library would become a huge mechanism for identifying what is wanted, then reproducing it from a central source for reading or playing back, rather than being a stack of books as now. Correspondingly, the librarian of the future would become what he has always been without realizing its full implications, an expert in the storage of information and its efficient retrieval.

The technology of information storage and retrieval, while it is galloping forward faster than librarians can keep up with it, remains just that, mechanisms for finding what is wanted, through previous systematic storing according to categories of what is likely to be wanted. No doubt some productive insights on the structure of knowledge will be forthcoming from practical problem solving in storing knowledge. But in general the librarians will not help the individual decide for himself what is most worth knowing. If anything, they will work to aggravate the pressure on the individual engendered by the rising availability of knowledge. Against this flood the individual's only defense is selectivity. And this selectivity itself thus becomes the most important continuing product of education in its broadest and deepest senses.

Parenthetically, the heightened availability of information of every kind through the electronic media has not merely made the problem of selectivity more urgent, but has made conspicuous one of the major shortcomings of the electronic media as compared with printing. This is the current inability of the user of electronic media to scan and select or repeat segments of a program or record, as he can with printed matter. The phonograph record or tape recording can be replayed, but at present particular segments on it can be found only with difficulty, and much time can be spent hearing or viewing unwanted material. Some innovative effort is going toward correcting this short-coming, but it will not yield readily. The format of a newspaper, for example, efficiently implements rapid scanning; it will be many years before broadcast news can be as efficiently scanned. Reading, furthermore, will probably always proceed far more rapidly than the human voice. Hence, some combination of print and sound will no doubt represent a more satisfactory synthesis than trying to obviate literacy altogether.

In addition to the problem of conserving time through scanning, the matter of repetition has immense importance for both learning and the development of the individual. Repetition of information helps memory, but is also of basic importance in what the psychologist Piaget calls assimilation of experience to the self. Closely related to actual repetition as in the rereading of pregnant passages of a book, is the need for interruption for internal rehearsal, review and the making of associations between new material and material already in mind. Without this process of asimilation, the development of standards of relevance and importance is hampered. The relentless flow of content through the electronic media may thus be said to hamper the growth of autonomy of the self, unless it is deliberately compensated for. But again, the electronic media themselves help to precipitate awareness of this need, which existed before they were invented although not to the same degree.

Finally, the increased availability of information through the electronic media has likewise made far more salient than ever before the realization that education cannot stop with formal schooling, but must permeate the whole of life if the individual is not to be cast aside by the course of events. This is not a new idea, but the reform of all institutions to facilitate the continuous development of their personnel is hardly recognized as their most urgent task, much less earnestly begun.

The Concept of Career

The idea that education does not cease with graduation from a school goes back at least to Epictetus, who wrote:

> Education, in the deepest sense, is continuous and lifelong. In essence it is unfinishable. What we think we already know is often less helpful than the desire to learn.

Nonetheless, even in the United States, which enjoys higher per capita wealth than anywhere else on the globe, we are far from achieving generally a state of affairs in which education is continuous and lifelong for every citizen. When that time comes, it will not consist simply of a state of affairs in which adults of all ages are enrolled in what now pass as adult education courses. A tremendous transformation of the social order will have occurred.

At the present time most occupations are not defined as professions, and most jobs are not viewed as careers. But the career is the vocational manifestation of continuous, lifelong education, and vice versa. Adult education at present consists largely of either the acquisition of supplementary vocational training of very specialized kinds, or the acquisition of supplementary avocational skills not too seriously pursued. Neither kind is addressed to the central concern of adult existence, what to become. It seems unnecessary nowadays to remind anyone that the question of what to become is no longer answerable once and for all at the beginning of adulthood. It may have been a necessity or a privilege only for the few in the past to reformulate their identities repeatedly throughout adulthood; henceforth it will be the necessity or the privilege of the many. But whether it will be a privilege or a necessity for any specific individual will be determined by whether his education makes him equal to the challenge of designing his own career and guiding its development.

The heightened availability of knowledge provided by the newer media contributes to the necessity for choice of what to become, and provides—as already sketched—greatly improved means for self-conscious appraisal of one's own performance, actual or potential, hence higher standards for selection of further experience. These are individual responses to the multiplication of alternatives. When many individuals are concertedly in process of becoming more selective, the long-run collective effect of their intensified discrimination is a general upgrading. For example, television viewing at present has declined from its peak of several years ago in average hours per week per person, and has declined even more among the better educated. In order to lure back this more desirable segment of their audience and prevent further deterioration, broadcasters either have to elevate the quality of their present mass programs or create specialized programs for this segment. Some are doing the former, some the latter. Given a general trend toward more discriminating markets and audiences, competition among purveyors of cultural fare ultimately causes the good to drive out the bad, short-run appearances to the contrary notwithstanding. For many years—probably ever since the invention of printing—it has been fashionable among aristocratic critics to decry the mass media which have made cultural fare more available to masses of people, on the grounds that somehow this was leading to debasement of culture in general. If the sales of paperback books are taken as an example, it is difficult to see what these critics could use as evidence that greater availability has debased the taste or knowledge of anyone. The evidence instead seems all in the other direction.

It has long been noted by adult educators that adults have to be dealt with differently as pupils than do children. Apart from the fact that adults are bound by no compulsory attendance laws, adults are highly discriminating in their judgments of the relevance of content and of the performance of teachers. While there is a fringe of participants in adult education courses who take them only to kill time, assuage loneliness, or be lightly entertained, the main incentives are usually serious vocational objectives, or equally serious efforts to acquire expert amateur status in avocations. Hence, adult pupils are demanding in their standards, and, since much adult education is unsubsidized, while attendance is voluntary, the course which patrons shun is quickly terminated. In other words, divorced from formal schools, education must pass a rigorous market test. In the past, education conducted in schools has rarely been forced to meet this market test, either internally, as among course offerings, or externally, as among competing schools. The shortcomings have been sheltered by the local monopoly status, which has simultaneously made them inevitably the target of controversy.

During recent decades, however, it has been evident that other media have been able to compete successfully with the schools more and more frequently. Lecturers on current events, travelers from foreign lands, authors and critics, to illustrate, appear frequently on television and radio and make the ordinary teachers of social studies or literature seem quite amateurish by comparison. As yet the efforts to develop what is called educational television have not been notably successful financially. Nonetheless, it is evident that when any kind of educational offering develops a large and avid audience, it quickly gets commercialized. The success of *Life's* science books has been as spectacular as such television programs as "Ding Dong School," "College Bowl," and "Meet the Press." If the cost of television broadcasting can be reduced to something near the cost of FM broadcasting, the potentiality for much more strenuous competition between commercial media and the schools emerges. At that point, not only will the newer media set a challenging standard for conventional patterns of adult education, but the pressure will be felt on children's education as well. Who would want to go to school and be miserable if he could stay at home, learn as much or more just as fast, and enjoy himself as well?

The questions which would remain if the newer media thus succeeded in driving out bad teaching would be those with which this essay began, whether schools and teachers and fellow pupils would be obviated. Again, the answer to this question, although qualified, would still be no. Schools and teachers and fellow pupils would still have important functions to contribute to learning, but to these would be added a basically more enjoyable presentation of material to be learned.

Education and entertainment have long been treated as separate categories of experience, despite the efforts of philosophers and psychologists to make clear that learning can be enjoyable. It may be that the most revolutionary consequence of the greater availability of learning made possible by the newer media will be to demonstrate universally that learning never has to be painful, that good teaching can be as enjoyable as the best entertainment. From the standpoint of the learner, given a choice between learning that is enjoyable and learning that is not, it is not likely that inherited beliefs would stand in the way of enjoyment.

Insofar as schools lost their local monopoly status through competition with commercial media, they would also lose much of their basis for controversy over curricula, architecture, and student conduct. Those who differ could go elsewhere; education would become as free as book publishing.

THEORIES OF AUDIENCE AND PERFORMANCE

It is characteristic of human thinking to make initial distinctions in simple polarities like mass versus individual, but with increasing sophistication to complicate these distinctions. Thus, instead of pursuing fruitless arguments over the values of mass and class, the impact of the newer media on culture in general can better be approached through systematic discrimination of types and sizes of audience in relation to kinds of performance presented. A classic, for example, seems to be addressed to men of all times and places, yet only a small elite of any particular time and place seem able to recognize a classic.

High school sophomores who are told that Shakespeare is great may remain dumbfounded by The Merchant of Venice. On the other hand, almost any American viewer, literate or otherwise, can appreciate the humor of Bob Hope—even though the next generation characteristically sees nothing funny in the humor of its predecessors. Perhaps the confusion about the effect of mass media in creating mass culture can be clarified to some extent by distinguishing between availability and accessibility. The Merchant of Venice can be made more available through television than through legitimate stage performance, but it does not thereby become any more accessible to the minds of viewers and listeners. Mass culture in the sense of universal recognition of Bob Hope's quips may take the place of provincial culture, with perhaps some loss of local variety but probably no loss of quality. In fact, his humor is likely to drive out worse humor, although the difference need be only marginal to be competitively successful. On the other hand, whenever or wherever a person exists who can appreciate Shakespeare, his level of culture is elevated by increased availability of Shakespeare. Shakespeare may not as yet be successful commercially on television, yet if complete video recordings of The Merchant of Venice, performed by the greatest actors, were as available as paperback copies of the text, it is certain that the elevating influence on the average cultural level of contemporary entertainment would be appreciable. And the bigger audiences so developed might finally make it commercially quite profitable.

Before contemporary methods for reproducing dramatic performances were invented, actors could perform various dramas thousands of times before face-to-face audiences, yet millions of people could live their whole lives without a single opportunity to witness a performance. While complaints are frequent about the shortcomings of mechanical reproduction, it is less common but far more appropriate to complain of the stultifying effect upon both performers and audiences (and teachers and learners) of excessive repetitions by performers. This is the really intolerable mechanical aspect of repetition, not the manifold mechanical reproductions of a single superb performance. With both moving pictures and television available, the Broadway actor can escape a role he otherwise has to perform hundreds of times. Before the newer media, he could not make a living without numerous repetitions of a limited repertory.

In both entertainment and education, stimulation and stultification are decisively important values in determining and judging results. So much stimulation comes from doing new things, so much stultification from inordinate repetition, that the familiar prejudice that mass reproduction deteriorates culture gets virtually reversed by close examination. There are many remaining situations in both education and entertainment where people still suffer stultification which could be alleviated by further use of the newer media. On the other hand, there are many situations where more face-to-face interaction between teacher and learner, performer and audience, is in order if education and entertainment are to be improved.

Out of professional thinking about these matters is therefore likely to come a much higher degree of self-consciousness as to which audiences are appropriate for which performances. In the teaching of languages, for example, it is important for the learner to be his own audience—hear his own voice—and the electronic language laboratory now makes this possible. He could always hear his teacher's voice and the teacher, his. At the other extreme, at a moment of national crisis, it is possible for the whole nation to hear the voice of a single leader simultaneously, whether its citizens are at work or at home, on the road or in the air. Between these extremes, however, many discrepancies occur between performance and appropriate audience. People are forced to listen to speeches who might better read the information they contain. Television and radio performers crave for contact with audiences; writers create for publics which do not exist. Manual training in the operation of equipment, highly suited to automated instruction, is still taught mainly by apprenticeship—the most expensive and least effective of all methods, one incompetent teacher per pupil, i.e., instructors versed in the equipment but not in the art of teaching. Practice-teaching itself, under the eye of a supervisor, is probably obsolete in the presence of the newer media. Not only do the newer media permit the student-teacher to view his own performance, but for many other learners to view it simultaneously on film or tape, to discuss it more fully and discriminatingly and objectively than any single observer could, with the learner able to hear such criticism while choosing to be present or absent.

A minor feature of this interaction, but one of immense importance in the general economy, is the previously noted bearing of communication on transportation and the housing of such interaction. How many meetings are held, the objectives of which will be more cheaply, swiftly, and effectively achieved when the public finally acquires the habit of using conference telephone hookups? Conversely, how much money is spent on advertising to convey messages of interest only to a few, who can nowadays be located by contemporary information systems and then be reached individually? Communication habits which presume traditional social relations have not changed as rapidly as communications technology has evolved. Could any procedure for the exchange of relevant and wanted information be more awkward than the means by which strangers somehow become acquainted in large cities? The sociologist himself has hardly begun to define this as a problem, much less to apply the newer media to its practical solution. Village marriage brokers did better in this respect. Yet the newer media evoke a host of such opportunities for relating individuals and larger audiences in ways which will modify previous patterns of association and activity in unimaginable ways.

THE GLOBAL AUDIENCE

In contemplating the effect of the newer media on the definitions of appropriate audiences in the future, it is apparent that just as they bring the individual as an audience of his own performance into view as never before in history, they also bring into view the potentiality of the entire world as an audience as never before in history. Indeed, the most exciting potential impact of these media on human communication is in the impetus they add to the ancient hope of a common international language. The very availability of the opportunity to converse with people in other lands characteristically encourages assimilation of language, as the long chronicles of warfare and conquest, trade and missionary activity disclose. Writing characteristically tends to stabilize and perpetuate language differences. Latin writings persist after the spoken language has disappeared, for example. By contrast, conversation continuously alters language, so that new words and phrases appear and old ones disappear, especially in border areas. The newer media foster diffusion of language, as of other cultural elements, without the necessity of migration. The United Nations could not transact its business at present without electronic methods for simultaneous translation, but the very existence of these electronic methods contributes to the rapid learning of common languages which will ultimately obviate simultaneous translation. The ultimate horizon of a universal language so induced—an electronic esperanto—will not be reached in this or the next generation, but movement toward it is sufficiently rapid as to be visible, especially among scientists, within just the period since World War II (and, deep in one's heart one may hope, perhaps fast enough to avert World War III).

In the so-called underdeveloped countries, it has become standard practice for people to leapfrog the technological history of countries like our own, to change, for example, from oxcart to airplane in a single generation, from leg power to nuclear power, without going through an age of coal and steam. Bolivian Indians fresh from the jungle have been trained as airplane mechanics through use of sound films, without ever learning to read more than simple markings on parts. It is therefore imaginable that members of primitive tribes will learn to speak an international language with people from anywhere else without having to learn to read and write any so-called written language. As soon as the ideal communications satellite is established in orbit (or in stationary position in space, whatever that means) and nonjammable global broadcasting becomes thereby feasible, local governments and nostaligc curators of the past will no longer be able to resist the tendencies toward an extremly small number of global languages. For governments deliberately seeking to eradicate a troublesome profusion of local dialects, such technology is an ideal instument. The electrical engineers who have already joined with statistically minded analytical linguists to invent computer-type electronic translators are hastening the process with all the direct rationality of applied science already. It may be that the time required to develop an electronic esperanto will prove overestimated at more than a generation, since only a single generation is required to produce a complete dissociation between parents and children.

CONCLUSION

It is often charged against radio and television that the nonliterate spend the most time using them. By one of the frequent ironies of history, it may be thus that the nonliterate become the first to acquire the new global language that is in gestation. In noting this irony, we come back to our basic analogy between the impact of printing on society and the impact of the newer electronic media. We can now ask, for example, if the newer media will have more effect on the more literate or the less literate.

It has been generally observed that the higher the level of education people possess, the more likely they are to engage in self-educational activities. College graduates study more in later life than people with only primary schooling. For them the newer media may thus appeal most strongly as a unique means for further development of their own performances, whatever their vocations or avocations. For the illiterate members of primitive tribes, at the other extreme, these new means of hearing vastly expedite their entry into world civilization, whether through learning to practice agriculture as our ancestors did in Neolithic times, or to preach neutralism at some world conference. So viewed, it becomes obvious that the newer media bring both literate and illiterate so much closer together in their power to affect events that the question of which has been moved the furthest becomes unimportant. Even for the literate, learning has not hitherto been painless; if education and entertainment becomes progressively indistinguishable, such a question as whether audio and video electronics are any less appropriate to education than books and printing are to show business becomes academic. Such a question will probably cease to be asked once the newer media are demonstrated to furnish the ideal method, in the hands of a good teacher, in a class of well-matched pupils, for teaching and learning reading and writing—literacy itself. Boiled down to their essentials once more, reading and writing are means for converting auditory into visual information and back again, with considerable impoverishment in the process. Electronic audio-visual recording, transmission, and reproduction convey information unchanged from its original (save by remaining mechanical infidelity), while immensely lengthening its reach in time and space.

The sequence of inventions which have led to the present question of the impact of the newer media on education and society can be construed as moving, like all inventions, in the general direction of extending human capabilities: the sensory functions of seeing and hearing, the mental functions of memory and recall, the physical functions of speech and movement. In the beginning, it might be said, each advance in some particular direction was accomplished at the sacrifice of some other function, sometimes, indeed, at the cost of added awkwardness and complication. It was a good advance in communication to invent a telegraph that could transmit messages instantaneously beyond the reach of either sight of sound. Thenceforth information could be communicated across space without requiring physical transportation of the paper on which it was written or printed. But the telegraph forced translation of auditory information into the visual form of letters and words in another coded language, and also required the training of specialists to do the coding and decoding. The telephone by contrast obviates both steps, making conversation at a distance between two persons almost the equivalent of face-to-face speaking and hearing. The application of television to telephoning is already here, in the form of closed-circuit televising of surgical operations, underwater explorations, and the holding of large conferences simultaneously in several rooms or even more dispersed places. As in all technology, the course of evolution of separate inventions for communications is thus toward synthesis and simplification, as well as toward the addition of further improvements. In respect to communication in particular, communication at a distance in space has now become almost identical in quality with conversation face-to-face. But meanwhile other improvements have been added which not merely equal the quality of the original, but go far beyond it in extending human capabilities quantitatively.

Some of the improvements of communication which go beyond mere fidelity in transmission over a distance are these: (1) larger size of audience through amplification; (2) dispersal of audience in numerous places; (3) simultaneous recording as well as transmission; (4) simultaneous visual feedback to the performer; and (5) automatic, instantaneous sampling of large audience reactions (i.e., mass munication is becoming mass communication, thus eventually obviating the laborious current procedures of audience research).

The current high costs of some of these improvements may, perhaps permissibly, be ignored here, since another conspicuous feature of technological trends is the drastic reduction of costs. After invention of the first successful video-tape recorder, the first manufactured model sold at close to $200,000 per unit. A simplified model using standard audiotape is now expected to sell at less than $200, that is, in the same price range as audio-tape recorders. So it is reasonable to anticipate that not merely broadcasting studios, or well-to-do educational institutions, can afford the latest inventions for audio-visual communications, but the ordinary individual consumer also. For this consumer, a built-in tape deck in his receiver, timed to record his favorite programs whenever they are broadcast, can be played back at his leisure. He is thus delivered from the tyranny of broadcast scheduling. Moreover, ultimately he may also be delivered from the tyranny of the sponsor who selects the content which will be broacast. If the so-called educational stations were to constitute themselves as libraries of notable past performances, and would broadcast these with high fidelity for home reception and recording, each member of the audience could rapidly accumulate the basis for attaining couplete sovereignty over his cultural fare. Indeed, such an unlimited library of recorded performances of every description, any of which may be replayable at leisure has already been dubbed a culture machine by J. B. McKitterick of the General Electric Co.

It is premature to imagine whether the home could, or would become itself the repository of the cultural wealth of the world. Perhaps the home would instead simply be connected by wire with a regional library, as with a local telephone exchange, which could be dialed for any information or performances in its catalog, not burdening the home with ownership or storage.

It is not premature, however, to imagine that the home will presently be conceived as a center for reception and assimilation of learning and new experience, and its electronic equipment will more and more be organized as a complete system, designed for education as well as entertainment. Although a connected system, there is much evidence in trends of circuitry and design that it will consist of compatible, replaceable modules—receivers, recorders, players, automatic timers, amplifiers, mixers, stereocameras, stereomicrophones, tuners and dialers, random-access tape files, stereospeakers and stereoprojectors. It is perhaps a minor consequence of no great relevance here, but the householder is tempted to ponder the day when the advance of erasable tape eliminates much of the printed paper which clutters his mailbox, home, office, and school.

Magnetic tape, like printing, was invented by the Germans. The Army Signal Corps brought captured samples to the United States during World War II, and the industry flourished so rapidly that the previous technique of wire recording was quickly abandoned. Technologists in many countries—England, Scandinavia, Italy, Japan, the Soviet Union, even India—are working so intensively to develop tape technology that any confident forecasts of what inventions lie ahead would be foolhardy. Perhaps tape itself will be superseded by a superior recording medium before it can supersede phonograph records or movie film. (In dollar volume, phonograph records already outsell all trade books published in the United States; tapes may before long outsell all textbooks.)

Regardless of the headlong pace in development of diverse technologies in all functions of communication—recording, transmitting, reproducing, and like—the ideal toward which they move will remain fidelity in seeing and hearing at a distance in time or space. That is, these functions may be simulated by technical means up to the fidelity of human perception itself, but that will be the limit of their practical development. There are uses for ultrasonic frequencies, for example, but not for human hearing, for infrared light, but not for human seeing. Hence, it is possible to think productively about the social effects of improved communication without being able to foresee all the inventions by which human seeing and hearing may be extended in time and space.

Is it too much to conclude that the newer media potentially connect the individual learner with any available knowledge in the world of past or present? In this sense, the goal of education—the ultimate development of the individual—is joined with the ultimate goal of communication—the unification of human society.

LIFESPAN EDUCATIONAL INSURANCE: A PROPOSAL

By RALPH M. GOLDMAN

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Educational programs designed to benefit this country's older citizens and keep them "active as a national resource of experience and skill" are far from adequate, says Dr. Goldman. To give future retirees a means of combating occupational, familial, and "psychic and intellectual" obsolescence, he advocates a kind of GI Bill for the aged and aging.

At Sonoma State College in California, the late Brewster F. Ames had returned to the college classroom to pursue studies in German literature and Shakespeare. He was, in fact, completely immersed in college activities, attending student functions, tutoring in languages he spoke, and living in facilities populated by students. The interesting thing about Ames was that he already had a degree from Yale, class of 1901. He was 88 years old and thoroughly devoted to campus life among students "who don't talk endlessly about their aches and pains." In fact, he declared, "I don't even know any old people, not a one."[1]

At the Santa Cruz campus of the University of California, a 6-week session called Methuselah I was offered experimentally during summer 1967. Forty-four students enrolled for the intensive liberal arts program under the direction of philosophy professor Maurice Natanson. It is hoped that the program may become a year-round operation with its own college in the Santa Cruz cluster of colleges. What distinguishes Methuselah I from the ordinary liberal arts curriculum is its students, who range in age up to 76.[2]

In 1900, when the population of the United States was 76 million, only 3 million—less than 3 percent—were over 65 years of age. Today, with 200 million population, there are more than 21 million retirees receiving Social Security benefits, that is, more than 10 percent of the population are senior citizens, with about 1.5 million persons a year reaching age 62. In 1900, a 45-year-old man could expect to live to about 69; today, the same person has a life expectancy of 77. In the relatively rural America of 1900, a retired person lived with his family and was occupied with a regular round of work or home activities. In the urban America of today, the retired individual tends to be residentially isolated, unemployed, and without meaningful daily pursuits.

With rapidly growing numbers of retired Americans living longer and in better health, a senior citizen crisis is not likely to be long in coming, if it is not already here. The average retiree is in fair health at age 65 and may live another 12 to 20 years. A high proportion seek new, if not income-producing, activities. Many resist being "filed away" as "old people," but instead search assiduously for the company of persons of all ages. Busy work quickly produces boredom. Growing numbers appear to be looking for opportunities like Methuselah I. And people like Brewster F. Ames may be more a sign of the educational times than a campus oddity.

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[1] San Francisco Examiner and Chronicle, Mar. 3, 1968, p. 11.

[2] San Francisco Chronicle, Aug. 14, 1967, p. 36.

FACING OBSOLESCENCE

Only part of the problem is keeping the Nation's retired citizens engaged in pursuits that are neither frivolous nor intellectually stagnating, and active as a national resource of experience and skill. There is also the trend recognized by Marvin Friedman in "Changing Profile of the Labor Force."[3] Between 1949 and 1965, over 6,000 "new" occupations appeared in the job market, and some 8,000 types of work disappeared. The steady decline in farm and blue-collar jobs is matched by a steady rise in service and white-collar employment. Caught between trends are several million individuals in the labor force in the 55- to 64-age bracket—too old to "retool" but too young to retire. Nevertheless, 1 or 2 million of these individuals apparently go into some form of early retirement each year, despite another 20 to 25 years of life expectancy.[4]

Persons in the 55- to 64-age bracket seem particularly vulnerable to developments that may have educational implications. Occupational obsolescence is one such contemporary trent, as old jobs disappear and new ones appear, as requirements for the same job change, as new technology and equipment emerge, and as automation replaces men with machines. Adult vocational education needs have only begun to be considered, mainly in response to automation. As the rate of occupational obsolescence increases and other types spread in the coming decades, the educational anxieties of these preretirement workers will grow.

The 55-to-64-years-olds, particularly women, are also beginning to face what may be called "familiar obsolescence." Their children have grown up and are self-supporting. Income requirements tend to drop or level off, but few arrangements exist for reduced workloads or partial retirement. Even with a full workday, persons in this age bracket find their leisure hours longer and their recreational-informational needs greater. With familial obsolescence often comes a realization that one's own personal development, particularly in the educational sense, might at last warrant attention. Because each new generation of Americans tends to have more formal schooling than the previous, older men and women at any point in time have less formal education than those in the lower age brackets. Thus, in this decade, only some 48 percent of the persons age 55 to 64 have completed more than eight grades. Over 50 percent of this group never finished high school, and the overwhelming majority never attended college.[5]

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[3] American Federationist, July 1967.

[4] U.S. Department of Labor, Monthly Labor Review, April 1967.

[5] Clark Tibbets and Merrill Rogers, "Aging in the Contemporary Scene," Education for Later Maturity, ed. Wilma Donahue (New York: William Morrow & Co., 1955), pp. 33–34.

"TOO OLD TO LEARN"

Another educationally relevant hazard of aging is "psychic and intellectual obsolescence," best summarized in the time-worn phrase "too old to learn." At best, the evidence of memory loss and declining learning capacity among older persons is highly uncertain, although the myths concerning these difficulties are potent.

Education and learning are areas in which the elderly mystique has caused incalculable harm through discouragement of would-be elderly learners and would-be teachers. Study after study has demonstrated that, with adequate motivation, old people are capable of learning efficiently and well.[6]

One gerontologist has made explicit a vision of the role education could play in the lives of the aged:

> I am inclined to believe that the field of education offers unlimited opportunities for people who have been relieved of work and family responsibilities. It seems to me that the complexities of our industrial civilization require that youth limit their education primarily to technical and scientific training. They emerge from our schools and universities as well-trained technicians, but rarely as educated people. It is my contention that only the retired person can become the truly educated person of tomorrow * * *.[7]

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Programs for adult and continuing education throughout the Nation have, for the most part, evolved in a piecemeal and haphazard fashion, particularly educational programs for senior citizens. A report by the Senate Committee on Labor and Public Welfare found that, in general, there are currently two types of educational programs for the aging: General adult education and activities designed specifically for the aged and aging.[8] The latter are typically offered by public libraries, university extensions, churches, adult divisions in State or community departments of public instruction, and private community organizations. These programs offer a broad range of educational situations and degrees of activity. Most provide informal educational activities designed to inform the senior citizen about the process of aging itself and to stimulate interest in leisure activities such as painting, reading, sewing, music, and so on. Preliminary studies in New York City indicate that these programs contribute to the mental and physical well-being of the older participants as well as to their enjoyment of life.[9]

SUBTLE SEGREGATION

Formal educational programs for the older citizen were found inadequate. The Committee on Labor and Public Welfare reported:

> There are only a few notable instances where educational agencies such as public schools, colleges and universities . . . have developed *specific* programs for the aging. While it is true that most classes and activities developed by them do not exclude older persons on the basis of age, relatively few are planned with the older age range in mind.

There is a prevalent and possibly unfortunate tendency to make adult education a process appended to or segregated within the customary institutions of formal instruction, an arrangement that usually denies to the young the presence of experienced adults in the same classroom and denies to adults the challenge of systematically communicating their experience to the young during regular programs of instruction.

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[6] Rosalie H. Rosenfelt, "The Elderly Mystique," Journal of Social Issues, October 1965, p. 42.

[7] Louis Kuplan, "The Road Ahead," Age With a Future, ed. Hansen (Copenhagen: Munksgaard, 1964), quoted by Rosenfelt, ibid.

[8] U.S. Congress, Senate, Committee on Labor and Public Welfare, Subcommittee on Problems of the Aged and Aging, "The Aged and Aging in the United States: A National Problem," 86th Cong., second sess., 1960, ch. 9.

[9] Ibid.

It is, of course, a subtle form of segregation to place grown-ups in one classroom and younger people in another in which the same subject is being taught. The older person may, indeed, be fearful of embarrassment in competition with youngsters. On the other hand, youngsters may be fearful of coping with the authority and breadth of experience of older fellow students.[10] Yet, the merits and demerits of such segregation continue to be moot questions. College teachers who have had retired military personnel enrolled in their regular classes are likely to testify that the mix of ages, experience, and skills is highly conducive to an outstanding classroom situation. In the words of the Senate committee:

> The stereotypes of the aged as ineffective, worn out, crotchety persons pushed aside while awaiting life's end, need to be exchanged for realistic pictures of persons who can bring to bear on life the accumulated skills and wisdom of a lifetime.[11]

The notion that life is essentially an educational experience is as old as Plato, in fact, a notion expounded by Plato, who took the position that the principal function of government is to educate its citizens. More than any other nation, the United States, with its unmatched range of educational enterprises and its substantial budgets supporting education, shares this view. From preschool to professional school and from correspondence course to television course, volume, variety, innovation, and even excellence are acknowledged qualities of educational effort. The newest petitioner for educational benefits is the older citizen.

After all, the average citizen in Plato's day was elderly, if still alive, in this third and fourth decade. Today, the United States has some 12 million citizens who are active and alert through their seventh, eighth, and even ninth decades! Yet, most of the formal educational establishment in this country is geared to the Platonic conception of early-life and short-life educational processes. The need and demand for new and more substantial approaches to adult and continuing education, occupational retraining for second and third life careers, intellectual and creative pursuits in retirement, and so on, are going to compel educators to reexamine the lifespan human educational process. Not only the need of the aging individual, but also the Nation's needs for the maintenance and social utilization of that 10 percent of its human resources over 65 are likely to become increasingly evident. For example, the Senate committee report cites evidence that many retired or retiring people are choosing second careers as teachers: Over 415 colleges and universities were hiring retired persons in 1957–58; over 240 were employing retired Armed Forces personnel. A survey revealed that, of Armed Forces officers expecting to retire between 1959 and 1963, some 24,000 were considering teaching as a second career.

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[10] On the preference of older people to associate with their age peers, see Irving Rosow, "Social Integration and the Aged" (New York: Free Press, 1967); Wilma Donahue, "Relationship of Age of Perceivers to Their Social Perceptions," Gerontologist, December 1965, pp. 241–45.

[11] Committee on Labor and Public Welfare, op. cit.

As with all new social and political problems demanding public and official attention, research is essential for program planning and policy development. The Senate committee, despite the scope and thoroughness of its research effort, acknowledged that its report on aging was only a beginning. Concerning the problem of education for the aging, for example, the committee identified some of the more obvious questions that require systematic investigation: (1) Should older persons be segregated or integrated in the educational process? (2) Should such educational services be provided free or subject to a charge? (3) Should the content of education for aging be concerned with a particular age segment, such as the years past 60, or should it consist of lifelong education which prepares the individual to live each stage most fruitfully? (4) Should the older adult leave his usual social environment for educational undertakings, or should education take place in his customary surroundings? (5) Who should design educational programs for the aging? Other issues and perspectives need the urgent attention of specialists and politicians alike.

One approach to social problem solving in this country of inventors is to create a plan or a panacea. This approach usually makes concrete the nature of a problem, the requirements for solving it, and the practical hurdles that stand in the way of accomplishment. This proposal for a life-span educational insurance program under the Social Security Administration is offered in this spirit—as a catalyst and an aid to concrete consideration.

GI BILL FOR THE AGING

A life-span educational insurance program would, in effect, constitute a GI bill for the older citizen. Like the GI bill, it would be a national investment in basic human capital "equipment," with all the obvious economic and social returns in the form of higher or sustained earning power, higher or sustained income tax returns, an enlarged national reservoir of knowledge and skills, and a lower national welfare bill, to mention a few. Unlike the GI bill, which was essentially a national gratuity for military service, the life-span educational insurance program could be financed through a combination of sound actuarial expectations plus subventions from the general revenue.

At the heart of the program would be a Senior Citizen Scholarship System. Citizens 55 years of age or older could apply for and obtain financial aids designed to assist them in accomplishing explicit educational objectives. These objectives might include not only the acquisition of formal degrees or educational certificates, but also approved or otherwise regularized programs of special study. Pursuit of these objectives would have to be substantial, that is, half time or more. Possibly current Social Security retirement rules could be relaxed to allow for partial and/or earlier retirement for citizens planning to engage in educational pursuits under the Senior Citizen Scholarship System. Such flexibility might be a precursor of a more flexible conception of retirement, wherein returning to full-time employment would be both possible and legitimate. Financial arrangements could be of many types: Full or matching tuition, partial or full living allowance up to some maximum, specified book and equipment costs, and perhaps modest allowances for dependents. Continuation of the senior citizen scholarship would depend upon the student maintaining some minimum level of academic performance.

ORIGIN OF FUNDS

Funds for the Senior Citizen Scholarship System could come from four sources: (1) An employee payroll tax, graduated to fall lightest upon the lower salary ranges and comprehensive enough to include all levels of earnings; (2) an employer payroll tax, graduated to require the largest relative employer contribution on behalf of the lowest salary ranges; (3) a voluntary, tax-free employee payroll savings plan, akin to the various tax-shelter plans now in operation, which could produce either interest or educational benefits; and (4) the general revenues of the Federal Government.

The proposed employee payroll tax, unlike the present social security contributions, would not fall most heavily on the low-salaried individuals. Under the life-span educational insurance program, a $3,000 annual salary might be taxed at 1 percent, while a $25,000 annual salary might call for a 4 or 5 percent educational tax to be paid by the employee. This plan would take the proportionately lowest contribution from the least paid and usually least educated. On the other hand, eligibility for educational benefits would presumably be the same for all employees, thus offering a substantial inducement for the less educated to continue their schooling as soon as possible.

The employer tax would be highest against those salaries at the lowest ranges, in effect penalizing the employer for paying low salaries. Thus, on a systemwide basis, educational insurance income would tend to become tied to those industries and occupations in which their is a high proportion of low skilled, low salaried jobs; that is, relatively high contributions would come from that part of the economy employing the educationally neediest segment. That employers in general may soon be dealing with educational-contribution bids by labor at the collective bargaining table is anticipated by Herbert A. Levine.[12] For example, Local 3 of the International Brotherhood of Electrical Workers located in New York City has successfully negotiated a plan for an employer contribution of 1 percent of weekly payroll to an educational fund, from which members and their spouses may draw for college tuition. In 1965 the United Auto Workers negotiated a tuition-refund plan of $250 per year, per person for all General Motors, Ford, and Chrysler workers. The concept of an employer tax for educational purposes is already coming over the horizon.

TAX ADVANTAGE

Tax-shelter annuity plans have become increasingly popular in recent years. The employer withholds and deposits into an annuity plan some regular amount of salary upon direction by the employee. The employee then need not declare this amount as taxable income at the time of earnings but rather at the time of annuity payment during retirement. In this way the employee receives the benefit of lower tax liability both at the time of earning and during his reduced income retirement. In addition, the withheld income earns interest during the years of deposit. The life-span educational insurance program would allow an employee to make such voluntary tax-shelter arrangements toward his senior citizen scholarship account. Thus, the citizen with specific, even ambitious, educational plans would have a way to build the necessary financial reserve, with special tax inducements. Of course, if his plans changed, he would still have access to the funds in his account, as would his beneficiaries if he should die.

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[12] "Educational Opportunity: A New Fringe Benefit for Collective Bargaining," Changing Education, fall 1967, pp. 42–46.

A large part of the life-span educational insurance program would necessarily have to be public, with resources drawn from the general revenues. The reasons are several and inescapable: The actuarial experience with educational insurance is practically nonexistent, although some experience could be drawn from the endowment policy plans of private insurers and from the GI bill program, the evolution of programs and facilities for senior citizen education is impossible to predict at this time; citizen response to new educational opportunities provided under this system is equally difficult to gage. So many unpredictables in so costly a program lead inevitably to the fiscal resources and flexibility of the Federal Government.

Everybody will undoubtedly have his own reaction to the proposal. Concrete proposals stir concrete reactions. Many questions and points of information critical to the proposal are yet unstudied and unanswered. For example, what is relevant actuarial experience? How may there be individual discretion about one's education with safeguards against malpractice provided at the same time? By whom and how may the program best be administered? What impact upon the existing educational resources of the Nation may be anticipated? Research and discussion are indeed necessary. The words of the Committee on Labor and Public Welfare summarize the case for a life-span educational insurance program:

> The development, conservation, and use of the potentials of the older members of our population should be one of the major concerns of society. Since education is one of the most significant means of achieving this purpose, it is important to consider the educational implications inherent in the problems and opportunities of aging.

DETERMINING MOST PROBABLE CAUSES: A CALL FOR REEXAMINING EVALUATION METHODOLOGY

BY JAMES L. WARDROP

The major point of this presentation can be stated quite succinctly: Namely, a central focus of educational evaluation is explanation (or, more precisely, the selection among several possible explanations). Once this thesis has been stated, the really hard work begins. I have now obligated myself to do three things: First, to explicate this succinct statement and attempt to give it substance; second, to justify the assertion I have made; and finally to indicate in some way how my thesis may be viewed as a reaction to the Phi Delta Kappa Study Commission materials. If I succeed in discharging any one of these obligations, my day will have been an unprecedented success, whether yours will or not.

A Notion of Causality

I circulated an earlier version of these comments to a number of friends, colleagues, and acquaintances (a few people actually fell into more than one of these three categories). A gratifying number of these people reacted. The reactions convinced me of two things: One, I had come up with the best projective technique for educational evaluators yet devised. (I will not take the time here to share with you the projective portions of those reactions.) Additionally, many of the reactions I received challenged my statement about the centrality of explanation to evaluation, for one reason. In that earlier draft, I made the following statement: "Explanation, as it is used in this paper, refers to the determination of the most probable cause for a phenomenon. Oh, the naiveté I exhibited in that sentence. I had forgotten that to use the word cause with people trained in the social sciences is much like sticking one's head into a beehive.

Nevertheless, I am going to stand by what I wrote then. (Naiveté dies hard in me.) One difference, though, is that I am going to try to clarify what I meant by cause in the context of this paper. Ernest Nagel, in his chapter on "Types of Causal Explanation in Science" in Lerner's book "Cause and Effect," has considered what he referred to as conditionally necessary causes. That is, suppose event E was observed. When E occurred, antecedent conditions A, B, and C were present. (It is possible, as Nagel pointed out, that we may be unaware of the existence of some or all of these conditions.) The general rule which applies to this situation might be stated as follows: Given that conditions A, B, and C are present, if condition D is also present, event E will occur; while if D is not present, E will not occur. Since condition D alone is not sufficient to cause the occurrence of E and since E may occur under some circumstances in the absence of D, we may speak of D as contingently necessary cause of E. This is precisely the notion of causality I had in mind in writing that explanation—the determination of the most probable cause or causes for a phenomenon—is a central focus of educational evaluation.

It is my contention that, in every type of evaluation presented by the PDK Commission, explanation is crucial. Further I would argue that the PDK volume does not adequately treat this concept nor does it adequately consider some of the implications of the concept for the methodology of evaluation.

THE ROLE OF EXPLANATION IN EVALUATION

In evaluation, as in experimentation, we seek to rule out, insofar as we are able, alternative explanations for phenomena. In context evaluation, we monitor the system in order to identify problems and isolate possible causes of these problems. Since the subsequent delineation of a class of possible change strategies is directly dependent upon the causes so identified, it is vital that the evaluator be able to provide information of such quality as to insure that the identification of a cause or causes have a high probability of being correct. In other words, alternative explanations for the observed phenomenon (problem) must be shown to be unlikely.

In input evaluation, also, the issue is one of explanation, the attribution of causality. (If we do A, then X will be more likely to occur than if we do B or C. I.e., A is a more probable cause—as "cause" was defined earlier—of X than are B and C.) Once again, the decision (to do A, or B, or C) determines how and where and to what extent we are going to invest our resources. The ruling out of—or assignment of low probabilities to—alternate causal relationships is critical.

One major focus of process evaluation is upon the early identification and removal of barriers to the success of the particular program selected to implement the change strategy. As before, we are faced with the need for valid explanations. To call something a "barrier to success" is to make a causal inference of the form: if Q, then not X. That is, the occurrence of (existence of) Q reduces the likelihood that X will occur (increases the likelihood that "not X" will occur). Solving the problems of barriers is in this way formally equivalent to making the kinds of selection decisions which input evaluation serves, with the same implications relative to the attribution of causality.

Product evaluation can be thought of as representing the effort towards final verification of the web of explanations which has preceded it. If the causal relationships postulated earlier have been correct (if the explanations have been valid), then the hoped for (intended) outcomes will occur. It is appropriate at this point to remind ourselves that other, unintended outcomes will also occur. It is in connection with product evaluation that we most often bring to bear the wealth of inferential statistical methods, apply our principles of experimental design, and in general call up our methodological "big guns." The concern in the present paper is that we cannot afford to wait until this final stage to provide a sound methodological base for causal inference. The methodology of experimental design and traditional statistical techniques may not be—and probably are not—appropriate throughout the evaluation process (see below), but some methodologies must be employed which will provide us with a sound basis for our explanations.

THE SEARCH FOR METHODOLOGY

The preceding paragraphs have made a case for the centrality of "explanation" to evaluation as it is represented in the CIPP approach. On the basis of those arguments, one must agree that the ruling out of (or assigning low probabilities to) alternative explanations—or at least providing data upon which to base such decisions about alternative explanations—is an important aspect of evaluation.

While the distinction between research and evaluation is important and needs to be emphasized (as the PDK authors have done), I fear that a preoccupation with the differentiation may lead to an overly casual attitude on the part of some evaluators toward the quality of the information on which explanations produced within the evaluation setting are based. Threats to internal and—in some instances—external validity must receive extensive attention. If anything, they are even more important in an evaluation setting—where decisions (based on chains of casual inferences) determine the allocation of previous resources to a considerable degree—than in most research (especially basic research) settings. If a researcher commits a type I error, he (or other researchers) may pursue an inappropriate question until the error is discovered. The possible consequences of an evaluator (or decisionmaker on the basis of information provided by the evaluator) committing the analogous kind of error are much more immediately felt in the resulting misallocation of resources.

The traditional model for educational research derives to a great extent from agricultural experimentation, after being filtered through experimental psychology. In his efforts to provide valid information on which to base explanations, the evaluator will often find this existing methodology both inadequate and inappropriate. In such circumstances, there are two alternatives to be considered. As a first step, and one which has considerable potential, we need to seek out from other disciplies—sociology, economics, anthropology, history, political science, et cetera—methodologies for arriving at valid explanations. A second alternative, once inadequacies in methodology have been identified, is to set out to develop new approaches for gathering and analyzing information, in order to minimize the probability that alternative explanations are in fact correct.

IDENTIFYING METHODOLOGICAL NEEDS

In the preceding section, a task for evaluation methodologists was laid out. One essential aspect of that task is the identification of evaluation activities for which existing methodology is inadequate. Through an emphasis on the underlying search for causality, we should be able readily to identify many of those inadequacies. This approach leads directly to a concern for the nature of *evidence*. What kinds of evidence will best enable the evaluator (or decisionmaker) to confidently discard alternative explanations as implausible? How can the evidence the evaluator collects best be communicated to the decisionmaker?

Given the position of the PDK Commission that evaluation serves the decisionmaker, other very important questions arise: What kinds of evidence is the decisionmaker willing to accept as bases for his inferences? Are these the kinds of evidence he should (according to some criteria) accept? The hope is that there is some commonality among decisionmakers in terms of the kinds of evidence they are willing to accept, that the answer to this question does not depend entirely upon the idiosyncracies of the individual decisionmakers, that given certain decision settings and decision types, decisionmakers in common tend to seek certain kinds of evidence. Answering the "should" question will take much hard, logical thinking and—probably—years of investigation in an effort to validate the outcomes of that thinking.

SUMMARY

If properly carried out, then, the task of the evaluator is in some ways much more difficult than that of the researcher. First, the evaluator finds himself working in naturalistic settings, settings in which many uncontrolled—and uncontrollable—sources of variation are operating. He is placed in the position of seeking consistent covariation over time and context, such covariation to be an important datum for his attempts at inferential explanation. Because the consequences of decisions based on evaluation data have considerable implication for (and effect on) the allocation of resources, it is imperative that gaps in extant evaluation methodology be identified and some of those resources allocated to closing the gaps.

You will have made an inference about my comments by now, one I wish to reinforce. (You probably made several other inferences I would rather not reinforce, also.) Namely, I do not have any panaceas; I am not even sure where the answers will come from. But I expect to spend a considerable portion of my time in the near future worrying the issue of evidence, explanation, and causality in educational evaluation; and I hope others will do the same.

CREDIT BY EXAMINATION AND THE EXTERNAL DEGREE

BY ROBERT J. SOLOMON AND JOHN R. VALLEY

The time may be ripe for the widespread introduction of programs supporting independent study and credit by examination and the development of systems by which unaffiliated students—those not classified as regularly enrolled—can achieve the undergraduate associate and baccalaureate degrees, and perhaps professional and graduate degrees as well. There is reason to believe that when all the details of external degree programs have been worked through by educational leaders the opportunities afforded by such programs will be perceived as applying not only to adults but also to many students who move without interruption from secondary to higher education. It may seem ironic that, at a time when we can foresee the advent of universal higher education, we should also contemplate an equivalency system that will greatly expand credit by examination for all students, both enrolled and unaffiliated, and for the latter, offer a new route to a college degree. However, there is no incongruity. Such a system would be the natural extension of the movement to expand the opportunities for higher education and the higher educational credential.

Historically, higher education in the United States has been closely linked to the social demand for professional and occupational training and advancement. The traditional credentialing system based on course credits and earned degrees was a way to produce recognizably qualified people. Yet we have known for a long time that the traditional system produces strikingly uneven results: the degrees awarded by some colleges are educational light-years from those of their presumed peers. Now as we move into an era in which the traditional credential is losing its special currency because it is more readily available, there may be an opportunity to revitalize the credential and at the same time to allow greater freedom and variety in achieving it. Perhaps if we are completely successful in this regard, we may even create new credentials that will be the preferred or esteemed degrees.

While the external degree and credit by examination are not new ideas, these ideas have not been fully developed in the college community. The fine print in many college catalogs promises credit to the ambitious college student, often by departmental examination, for knowledge that may have been acquired by non-traditional means. In most colleges, however, it is easier for the student to repeat a subject than to survive the academic obstacle course required for credit. The one widespread notable exception to this distrust of credit by examination is the college board sponsored advanced placement program. College faculties have accepted this program because they must admit, on the basis of evidence, that bright high school students can do college work outside college. However, there is a catch: for advanced placement in college the high school student must have taken an advanced course. The only radical departure in this case is the shift of the traditional college course to the high school.

There are at present, however, social forces both inside and outside colleges that may create the appropriate climate for change. One is the changing nature of higher education itself. For example, under pressure from students, faculty, and administrators who have come to recognize that course credits are not necessarily the best way to produce educated men and women, independently study within the college has grown in popularity. In many colleges today it is no longer unusual for upperclassmen to devote most or all the school year to academic work outside the traditional course structure, guided in reading and studying by their interests and their faculty advisors. Credit for such independent study may be based on a senior thesis or comprehensive.

Where the college arranges for the learning experiences of students to take place off campus—in community agencies, in businesses, in manufacturing plants, etc.—a dilemma arises. If it grants credit toward a degree for the learning of such students, how can it deny a request for credit from someone who has had quite comparable learning experiences as a regular employee? So the stage is set for the college to be forced to consider at least such a request.

Open admissions may also encourage credit by examination for enrolled college students. To accommodate the greater diversity of students on their campuses, colleges may be more willing than they have been in the past to use examinations to encourage students to move at their own level and pace. In the fall of 1970, as part of its open admissions program, the City University of New York offered credit by examination without regard to courses taken in high school.

Perhaps of equal importance in accelerating the movement to credit by examination and the external degree are various economic and technological trends. One is simply the increasing costs of formal higher education. On practical grounds colleges may need to find other ways to educate and credential their students than by building expensive facilities and filling them with expensive faculties. Looking beyond the college itself, we are promised a society in which we will have increased leisure time in a multimedia world, which will make it almost seductively easy for the reasonably curious and ambitious to learn. Moreover, the increase in leisure will be the fruit of a technologically based society in which career success may depend increasingly upon an individual's access to continual retraining. Combined, these two trends—available time and the carreer need for learning—are likely to make continuing education a reality for a large portion of our population.

Finally, concurrent with these developments is the new American revolution of rising expectations among the formerly dispossessed and disadvantaged. For those adults beyond the traditional college age, credit by examination including an external degree is a way of demonstrating that whatever their formal schooling, they are in certain important respects educated men entitled to the social and economic recognition that this society gives to credentialed educated men.

To a significant degree the technology to develop programs in support of independent study, credit by examination and the external degree is already at hand. Such programs will require the means to present the evidence for an individual's college achievement, including his general education both in humanities and sciences. We will need to measure accomplishment in major fields, in individual subjects such as business law or organic chemistry, as well as in combinations of disciplines and systems of knowledge. In addition to paper and pencil gauges, we will need to measure actual performance—a criterion for success even in some college courses—in areas such as accounting, mechanical drawing, or laboratory techniques in basic science. We will need some means to evaluate an individual's actual work experience.

The measurement of achievement at all educational levels is indeed a more sophisticated process in the 1970's than it was 15 or 25 years ago. It is also much more demanding of skills and professional competence than the average faculty member is prepared to admit. Further, we are more keenly aware of the variety of dimensions of individual talent and potential. There is no reason to believe that independent study, credit by examination, and external degrees should be used by all students. If this is the case, a problem will confront us as to how we might assist students, faculty, and administrators to decide who is ready for credit by examination, who should pursue an external rather than a traditional degree, and when readiness for independent study has been attained. Although not all these techniques now exist, we do know much about how to develop the necessary instruments and procedures.

For the unaffiliated student guidance and counseling will be essential. In this area there is less collective wisdom and experience. One immediate problem will be how to inform unaffiliated students that college credits and degrees are more easily accessible to them, although, as credit by examination becomes commonplace this may be less of a problem. Once we have reached the unaffiliated student, we will need to provide him with ready access to information—publications, guides, and handbooks—and more important perhaps, to counseling centers where knowledgeable people can help him move into an external degree system. It is also quite likely that the unaffiliated student will need such services over time spans that will differ from one individual to another. In part this aspect grows out of our expectation that the time spent by individuals in the pursuit of an external degree might be much more variable than is the case with traditional degrees.

One special problem of awarding external degrees to unaffiliated students is related to the less tangible, less formal outcomes of higher education. Although, in practice, as a society we have always placed great emphasis on the practical, vocational aspects of higher education, we have also believed that higher education is more than a preparation for an occupation, and the college experience itself is more than the sum of courses taken. How will we answer the critic who claims that no set of examinations can ever be equated to the college experience? Will the college experience itself need to be in some way a requirement for the external degree? Will we need to provide some means to affiliate the unaffiliated with an institution? On the other hand, should we and can we find ways to measure for the unaffiliated student his acquisition of the intangibles of the college experience?

There are positive aspects to the problems delineated in the preceding paragraph. There is a good possibility that the external degree may stand for certain kinds of learning experiences that are valued and that the traditional student either may not have had, or having had, they were transitory and left little imprint. We are all too familiar with the fact that for many traditional students the attainment of an undergraduate degree comes automatically upon the accumulation of a prescribed number of course credits. Perhaps the student is asked to relate knowledge, views, or attitudes from one course to another in his major field, but he seldom confronts problems or issues that cut across courses outside his specialization. It may prove that external degree programs can be structured to assist students in mastering and synthesizing courses of study and incorporating these into their total educational experience by requiring them to demonstrate their mastery of the material. This might come about simply as a practical solution to the problem of what a student who wishes to qualify for an external degree largely via the examination route might be expected to do. Surely we cannot, and we will not, expect such a student to sit through 30 or 40 or more course-bound examinations. More likely we will give students far fewer examinations. More likely we will give students far fewer examinations, but these will be cumulative summaries or syntheses of their learning.

The most difficult problem will be to achieve the commitment of a significant number of reputable, even prestigious, institutions willing to award credit by examination and the degree earned by this route. Unless this is done, our ability to measure college equivalence will mean little. In this regard, we may be able to learn something from the history of the Advanced Placement Program. From the beginning there existed a nucleus of colleges—indeed, a consortium—which in fact awarded placement and credit. Also in the first years of the program these institutions, through their representatives, participated in determining Advanced Placement policies, procedures, and examinations. On the other hand, in the first year of the New York College Proficiency Examination Program, over 100 collegiate institutions declared their willingness to consider granting credit to students who took the New York State examinations, in practice this was largely a hollow gesture equivalent to the fine print in college catalogs promising credit by examination. The active dedicated commitment of the colleges is essential to the success of credit by examination and the external degree.

There exist at present the beginnings of a credit by examination, external-degree program. There are several testing programs with instruments that could be used to create a national program. In the early 1960's Educational Testing Service initiated the comprehensive college tests. Now, with the support of the Carnegie Corp. and under the auspices of the College Entrance Examination Board, this program has become the college-level examination program (CLEP). CLEP now has examinations in 28 different subjects ranging, for example, from American government to computers and data processing. A number of additional subject examinations are in various stages of development, including four that measure achievement in college-level medical technology courses. CLEP also includes a battery of five general examinations designed to measure the general education of an individual compared with that of a regularly enrolled student who has successfully completed 2 years of undergraduate study. Between two other national testing programs—the undergraduate program and the graduate record examinations—more than 24 examinations are available for majors in all the more popular undergraduate liberal arts fields, such as history, and in some professional fields, such as business. In addition, through research we have learned how to obtain biographical and experiential information useful in evaluating individual accomplishments. And in the area of performance, the in-basket test is one of several techniques for simulating working situations.

CLEP is achieving increasing success. Several colleges are actively using it to award credit by examination: American University in Washington, D.C., for example, has awarded up to a full year of academic credit based on these tests. The University of Iowa will award up to 8 hours of credit for four of five general examinations. CLEP has also been used outside the academic community. The U.S. Armed Forces Institute's need for college equivalency tests was one reason ETS first developed the forerunner of the college-level examinations, and USAFI is today one of the largest users of the College Board's program. Of encouraging significance for the further development of credit by examination and external degree programs is the fact that among servicemen tested through USAFI, several thousand test scores equaled or exceeded the credit level recommended for the tests by the Commission on Accreditation of Service Experiences of the American Council on Education. In addition, the State boards of bar examiners in Florida and Georgia, the Indiana Library Certification Board, the Pennsylvania and California State boards for the examination of public accountants, and the Port of New York Authority have made use of CLEP to measure college equivalency. But there still remains the immediate need for commitment by a significant number of institutions to adopt procedures that would enable competent and ambitious individuals to earn a degree without perhaps taking a single formal course in an institution.

CRITICAL ISSUES

In a very important sense, the current major roadblock to the further development of external-degree programs is the necessity to expose to close examination a series of critical issues. There is, indeed, a gap between credit by examination and the external degree as abstractions and sound operational programs. Most of the issues are particularly difficult because they are concerned with what should be done. For example: Where should external degree programs be based? Should the external degree be built into existing college and university operations? If so, should all colleges be encouraged to develop their own variation of such a program? Should existing State agencies or instrumentalities be used as the base for external-degree programs? Does the external degree represent something that either existing or newly created consortia of institutions should develop? Do we need national programs and new national institutions, agencies, or instrumentalities to provide external degrees?

In addition to the above questions, there are constellations of issues. What is a sensible schedule for the development of programs? That is, what are the priorities of needs? What criteria should apply in assessing these priorities? Should the focus of early programs be on service to adults? Should the needs of regular college students be given preference? Are we more capable of delivering or initiating certain programs earlier than others? Are the priorities the same in all parts of the country or at all levels of society?

How closely should external-degree programs parallel or relate to regular-degree programs? What does a regular degree stand for? What protections do we need to build into external-degree programs to insure that the delicate balance between high quality and reasonable standards is attained? Do we need new organization or new institutions to protect the public interest in external-degree programs? How can we bring the proprietary educational resources into the service of external-degree programs? How can the concept of an external degree be used so as to expand curricular flexibility at the undergraduate and graduate levels?

What are the instructional resources that are available for external degrees? How can we inventory and appraise the worth of all the instructional materials that have already been developed—the materials that already exist on film, videotape, cassettes, records? What mechanism do we need to determine what additional materials are needed or where they can be obtained? How do we bring these new instructional resources to the student at reasonable cost? How can we make sure that in our use of modern technology, we will not dehumanize the independent learner?

Are there needs for forms of recognition other than course credits and academic degrees? Is the concept of credit by examination equally valid at all educational levels—how viable is the idea at the high school level, at the graduate and professional level? What credentialing arrangements are most appropriate for postsecondary, vocational, and technical achievements?

What are all of the means at our disposal for assembling evidence of individual learning and achievement? While this paper has given primary emphasis to credit by examination, the authors do not believe that examinations should constitute the only means for demonstrating achievement. What can be done by way of applying the concept of accreditation to this process? How can we systematize the recording, the analysis, and the appraisal of work experience? Do the techniques used to appraise military service, training, and education have broader applications to the civilian components of our society?

The perceptive reader will also note that practically every one of the issues has educational, economic, or political overtones. This does not argue for not developing credit by examination and external degree programs. It merely argues for moving responsibly and carefully.

SOME EXTERNAL DEGREE MODELS

Those who would contemplate establishing external-degree programs should be aware that there are many different designs for such programs. Several have been tried abroad—for example, the University of London and the recently established British Open University. Some programs have been in operation in this country for several years—at Oklahoma University, Goddard College, Roosevelt University, Syracuse University, and other institutions. New operational programs have just recently been announced by Brigham Young University, and the State University of New York College at Brockport. Other programs such as the Regents of the State of New York and the National College, Inc., are on the drawing boards and they are accompanied by a serious intent to implement them as soon as all the necessary mechanisms can be assembled. A careful study of all of these programs will reveal that the word "external" as used in external degree has significantly different meanings. In some of these programs the instruction can be external to the central or degree-granting authority. And the range of possibilities in this dimension is tremendous. At one extreme, the individual student can be responsible for somehow assembling the instruction or arranging for the teaching-learning experiences he needs—by going to the library, buying books, visiting museums, responding attentively to life around him. And he has done this to his own satisfaction, he presents himself for examination. If he is successful, he is then appropriately credentialed.

At the other extreme, while the central, or degree-granting authority, provides the instruction, it does so off campus. The instruction may therefore be offered via correspondence, by television, by cassette, or by combinations of these. The clue to understanding "external" in this instance is not the absence of a live instructor. In some instances the instructor may go to a business or a manufacturing plant and offer the live course off campus. The instructional program of the Polaris submarine crews involves many combinations of external forms of instruction.

Certainly another connotation for external is that which pertains to the locus of the examining, appraising, or assessing authority. High school students who participate in the advance placement program take external examinations. That is advanced placement examinations, prepared by ETS for the College Board are made available annually to students prepared in high school who are seeking college credit. When the New York Regents' external-degree program becomes operational, we will see people being certified for a degree by an educational authority that does not itself offer the instruction leading to its degree.

Another model that has been recently described would call for the creation of a new institution—a national university—that in its own right could offer degrees based on examinations and that could offer external degrees jointly with regular colleges and universities that elect to cooperate with it. The suggested design would not have this new institution competing with existing instructional resources but instead it would try to encourage the use of these resources in the service of the independent learner. At the same time, since the national university would have independent learners as one of its primary clientele groups, it would arrange for the special kinds of guidance, counseling, and advisory services such individuals need. It would also establish arrangements for the banking of all varieties of records of educational achievement and systems whereby the individual could draw on these services over time, as needed for his career and personal development.

SOME CONCERNS

During the course of the last year or so we have noted a surge of interest in credit by examination and external-degree programs. Many factors have contributed to this enthusiasm including the fact that the British Open University has become operational. In addition, several responsible educational leaders such as Ewald B. Nyquist, commissioner of education, New York, and Alan Pifer, president of the Carnegie Corp., have taken public positions in favor of the development. More recently, with foundation support the State University of New York and the New York Education Department have announced plans for experimenting with the external degree.

At the same time we cannot help but be concerned about the possibility that some of the interest may simply reflect the fact that the external degree may be the most recent or current educational fad. Educational innovation of any variety, and the external degree is no exception, attracts some whose predilections are for the in-thing, no matter what its shape or form. As higher educational institutions feel the tight financial pinch, there will be greater pressures to respond favorably to external degree programs exclusively for financial reasons. Under these circumstances the full educational potential may not be realized. There is a fairly good yardstick for sorting out the Johnny-come-latelies to the external degree from those who wish to deal responsibly with this concept. The former regard the concept as intrinsically simple and sense no problems whatsoever to implementing programs very quickly.

It would indeed be all-too easy to create a crop of diploma mills in the 1970's unless we are very alert to this danger. There is a public skepticism that will act as a brake on the development of such programs, yet this skepticism will not be sufficient to prevent them. Deliberate action must be taken to design and implement high quality, educationally sound programs.

At the same time, we need to be sensitive to the fact that high standards will be used as a dodge to frustrate the development of sound credit by examination and external-degree programs. CLEP has already met, and not solved, the problem of the faculty member who refuses to grant credit by examination because "the student didn't take *my* course,"—or rejection of credit by examination by entire institutions because of the unsupported claim to uniqueness of method or purpose, or objectives, or goals, or students, or faculty, et cetera.

NEXT STEPS

Up to this point, this paper, in broad outline, has developed the argument that credit by examination and the external degree are concepts that merit careful and responsible development, that there is widespread and growing interest, and that in many quarters individuals and institutions are prepared to establish such programs. How can we proceed?

In January 1971 the establishment of national commission on non-traditional study was announced, under the chairmanship of Samuel B. Gould, chancellor-emeritus, University of the State of New York. The commission is sponsored jointly by the College Entrance Examination Board and Educational Testing Service. It is being supported for a 2-year period by a grant from the Carnegie Corp. The commission's task will be to assay the opportunities for learning out of school at the postsecondary level and to make recommendations with respect generally to the nature of further development of these opportunities and specifically to the mechanisms for providing formal (academic) recognition for such study, including explicitly at the earliest possible date recommendations with respect to the development of external degree programs in the United States. The commission will bring a national perspective in the public interest to the rational development of external degree programs and the maintenance of academic standards in them.

With respect to nontraditional study at the postsecondary level, the commission's effort would involve—

An analysis of the variety of opportunities now available for such study and of the possibilities of extending them;

An exploration of the auspices under which credit for such study is being or could be awarded;

An evaluation of the need for a coordinated national effort to promote and service the concept of learning out of school; and

The development of recommendations for exploiting existing opportunities and viable new possibilities in fulfillment of the need in ways which will insure the awarding of credit.

With respect to the external degree, the commission's function would include the following:

An analysis of the proposals which have been and are now being made for external degree programs;

An exploration of the auspices under which such degrees can be and are being granted, including institutional, state, and federal auspices;

The design of a limited number of specific models for the awarding of such degrees, based on examinations and/or other sources of evidence, including a national model;

The development of procedures and standards for such awards.

Concurrently with the establishment of the commission, CEEB and ETS have taken an additional step that deserves the attention of the educational community at large. A jointly sponsored Office of External Degree Plans has been established to support external degree programs generated under the sponsorship of other agencies and institutions. In its early phase the office will be concerned with coordinating the existing examination offerings of ETS and CEEB and bringing these into the service of external degree programs. The office will also offer advisory services to institutions and other educational authorities and consulting services to business and government. Later the office might—depending upon the findings and recommendations of the commission on nontraditional study—arrange for the counseling of individuals and their referral to independent study resources, the accreditation of independent study experiences, and perhaps the preparation of study guides.

We believe that through the office of external degree plans and the commission on nontraditional study the mechanisms have been created to service both the immediate and the long-range development of educationally sound opportunities based on credit by examination and the external degree.

A LOTTERY SYSTEM FOR HIGHER EDUCATION

BY LAWRENCE B. DeWITT

Let us look for a moment at higher education in terms of a set of trade-offs between three interests: students, society, and the colleges. The students have two, not entirely separable, interests in higher education. First, and most obviously, higher education is the path to desirable and lucrative jobs. And a college education is increasingly necessary for such jobs. Second, there is a range of esthetic, self-fulfilling and maturing interests which higher education can satisfy. These are internal—they are intangibles.

Society or "The Public" has interests very much parallel to those of students. First, it has a need for trained personnel: engineers, lawyers, doctors, soldiers, and so forth. Second, there are collective benefits from having an enlightened citizenry which is somewhat knowledgeable about and interested in art, science, public affairs, and so forth. We can note at this point that these social or public interests match up with the interests of the students: in both cases there is an occupational and also an "enlightenment" concern.

Consider, for a moment, that the primary interests of the colleges and universities may be altogether different. They are largely concerned about prestige—their own prestige as compared to that of other colleges and universities. Institutions of higher education are popularly misunderstood to be primarily concerned with teaching and research. This is a fallacy. They are primarily concerned with raising or at least maintaining their position in the academic hierarchy or pecking-order. An administrator's prestige and status are very much a function of the prestige of the college or university where he works. A faculty member's prestige and status are also very much related to the pecking-order of the college where he is employed, but it is also a function of his personal standing in his field, which is determined by his research.

None of this should be taken to mean that colleges, administrators, or faculty are not concerned with teaching. They are. Nor does this mean that faculty members and administrators are not concerned with serving the public interest. In fact, it might be argued that, taken as a whole, the professional academic community is more personally and sincerely concerned about furthering the public interest than any other major occupational group.

Nonetheless, we must continue and ask: In what form is this concern expressed? The suggestion here is that, like almost all people, their own interests, careers, ambitions, status, and so forth come first. I see the colleges—faculty and administrators—working on behalf of the public interest once their own fundamental and personal prestige concerns have been satisfied. And this satisfaction comes from their particular college admitting the most highly qualified students they can lay their hands on. The reason is simple: The better the students attending a particular college, the greater is its prestige. Of course, there are secondary reasons too. For instance, most faculty members derive more pleasure from teaching bright students than from teaching the duller ones. But the primary motive remains that of maintaining or enhancing the academic status of the institution.

Another way of looking at academic prestige and status—and the terms in which it is usually discussed by administrators and faculty members—is in terms of standards—maintining standards. One might well ask: Well, what's wrong with maintaining standards? Certainly we do not want low quality higher education. The question here concerns the definition of "standards" and "quality." And the problem is that these terms—standards and quality—are usually used to refer to the students themselves as inputs to the higher education process, not to their growth, development, or learning. It refers to something that has already happened to the students before they attend college, rather than to the quality of the process they undergo while attending college. It is worth noting that there are virtually no measures of the "value added" to an individual, or his learning, in the course of his college education. We can observe that the "best" schools produce what are in some sense the "best" graduates, but we cannot tell if this is simply because these schools begin with the best high school graduates in the first place. This tells us nothing about how much the college adds to its students. Nor does it tell us anything about which sorts of schools are most likely to make the greatest contribution to which types of students. In this area there is almost a total knowledge vacuum, despite the fact that it is the single most important question about the substance of higher education.

There is, of course, a social equity principle behind the notion that the best students should be admitted to higher education, and that the best students should be placed in the best colleges, the mediocre students in mediocre colleges, and so forth. The principle has been labelled "merit." The best high school students are seen as being the most deserving of or the most able to utilize the best higher education. As was pointed out above, there simply is no data available on who is able to utilize what sort of higher education how well. And the former point—concerning who deserves any or what sort of higher education—constitutes an enormous, problematic assumption. One might equally well argue that the academically dullest deserve it the most, because they are the most in need. Similarly, one could argue that since higher education is increasingly a publicly provided service, and that since "possessing" a higher education confers enormous monetary benefits on the specific individuals who receive it that all persons should be provided an equal chance to gain this publicly conferred benefit. Given that there exists a hierarchy or pecking-order of colleges, and given that the educations and degrees offered by the "top" schools are more valuable than those offered by the "bottom" schools, it can be contended that all applicants should be provided an equal chance of being admitted to the school of their choice. This could be done by a device similar to that now employed for distributing a major publicly conferred burden: the military draft lottery.

We must now ask what all of this has to do with public policy and the public interest. It seems reasonable to look at this in terms of two major concerns: First, the welfare of the society as a whole—our collective interests, and, second, the fair and equitable treatment of the individuals comprising our society.

Concerning the first of these, it is clear that we, as a society, benefit from having the best possible doctors, lawyers, politicians, engineers, and so forth. It is possible to extend his concern into a very "elitist" position: This top leadership strata of our society is by far our most important national resource—the better they are, the more developed and advanced our entire society becomes, and we all share in this progress. Therefore, every possible educational advantage should be directed to these future leaders. But it is also possible to look at this same concern in an entirely different way. It is quite reasonable to argue that these same "heir apparents" to the power structure of the Nation will rise to the top positions regardless of whether or not they go to Harvard and Berkeley. Furthermore, if one senses that the major problems and crises confronting this society fall into the range which can broadly be described as "human" and "distributional" rather than "technical" and "aggregate," such a poverty and the distribution of income and jobs, racial antagonisms, interpersonal cooperation, communication, and coordination, and so forth, then doesn't it seem quite reasonable to suggest that the last thing we need is a fairly rigid, hierarchical system of education in which the wealthy and middle class tend to dominate the "better" schools, while the lower income classes and the blacks tend to populate the "worst" schools?

The second major public policy concern—the fair and equitable treatment of all individuals in the society—can be looked at in similar terms. There are several different principles of equality which can be employed, and they result in drastically different conclusions. The merit or excellence principle has already been described: Those who are in some sense most able or most accomplished are seen as being the most deserving. This can be viewed as entirely complementary to the elitist and heir apparent positions just outlined.

But there is also a contrary, more egalitarian, principle of equity, which is the one to which I subscribe. This, too, was mentioned earlier—higher education is in fact increasingly a public activity. It confers considerable monetary and other advantages upon those who receive it. Certain individuals should not be favored over other individuals in this gigantic public sweepstake? Furthermore, it would do much to reduce such enormous domestic crises as poverty and the distribution of income, and frictions between races and income classes were we to establish a more fully equal system of higher education in which everyone regardless of race, creed, sex, academic achievement, or native intelligence, is given an equal chance to reap the benefits of higher education. A lottery system for selection into higher education and into particular institutions of higher education appears to be one way to accomplish that social objective.

So far I have talked rather broadly about social interest and social equity. These clearly are fully legitimate public policy concerns. But there is also a more immediate way in which a lottery system is of relevance to educational policy.

Throughout this century—and especially during the last 20 years—higher education has undergone an enormous quantitative expansion.

This has been the direct result of an increasing demand by the public for the benefits which a college education provides. So far higher education has done a fairly satisfactory job of meeting this demand. But I suspect that this satisfaction will be very short-lived, even if the number of new openings in higher education continues to grow at past rates.

The reasoning is simple. For those social groups recently admitted for the first time to higher education, this has represented a dramatic step forward for themselves personally and for the society as a whole. But where have those newly admitted social groups been placed in higher education? I referred earlier to the existence of a fairly clearly defined pecking-order of higher education institutions. It is fairly obvious that the newly admitted social groups (largely middle-class and lower-middle-class blacks and whites) have been funneled for the most part into the lowest reaches of the higher educational hierarchy. So far this has not caused many problems because the simple act of admission to higher education—any form of higher education—has seemed quite impressive. After all, it is a college education. But the real question is not simply who gets a college education. It also involves asking what kind of an education and how good an education.

Starkly put, for how long will lower-middle and low income parents and students, especially black ones, be content with what they have good reason to regard as a second class higher education? Not only are more public dollars spent on your education if you go to a better school, but also you are more likely subsequently to earn a higher income.

Given the massive criticism of higher education from many quarters in the past few years, a new attack on higher education from this equity (who goes where) basis could expect to find many allies waiting in the wings. This would be especially so if such new discontent was expressed in terms of equal educational opportunity. And this seems most likely.

A random admissions procedure would be one obvious institutional response to such discontent and criticism. Less extensive, but still satisfactory, responses might be possible. But if my prognosis is correct, the institutional response will have to be quite drastic—drastic on the order and degree of widespread adoption of a lottery system for admission to colleges.

TEACHING IN THE KNOWLEDGE SOCIETY

BY FREDERICK J. McDONALD

Everyone agrees that our educational system needs good teachers, but few agree on what is meant by the good teacher. There is also considerable dissatisfaction with and criticism of teaching, teachers, and teacher education (Holt, 1964; Silberman, 1970). The criticisms are multitudinous and varied. The most common charges are that the schools destroy children's desire to learn; fail to produce adequate achievement; do not supply sufficient and well-trained scientists, engineers, business managers, doctors; produce an uninformed citizenry susceptible to the attractions of alien philosophies; and fail to educate children fully to the hazards of drugs, tobacco, and alcohol. Few social ills of our society have not been attributed to a failure of the schools to do something that would have prevented the genesis and development of these ills.

On the other hand, Americans vigorously defend their school system. Despite the disruptions in the universities in recent years, Americans pride themselves in having created the first system of universal higher education. Despite recurrent taxpayers revolts, the United States has spent more on education in the late 1960's than on defense. We spent more on education than on all other nondefense community services together—health care, welfare, farm subsidies, and so on (Drucker, 1969, p. 311). This ambivalence about education, on the one hand strongly criticizing our educational system, and on the other hand, munificiently supporting it and urging its expansion, is symptomatic of the great value American society has come to place on the education of its citizens.

The most interesting characteristic of this criticism is that it almost invariably focuses on the quality of teaching and teachers and has stimulated a decade of efforts to reform teacher education. Since the 1960's considerable attention and money has been spent on surveys and analyses of teacher education, the best known of which was James Conant's study, reported in his book, "The Education of American Teachers" (Conant, 1963). The Federal Government, through the U.S. Office of Education, has poured large sums of money into the analysis of teaching and teacher education—there are two research and development centers devoted to teaching and teacher education; a program for the radical renovation of the training of elementary teachers has progressed through its first two phases; conferences on teaching have been numerous; a sizeable portion of the basic research supported by the office is focused on teaching behavior. But, little change has occurred. It is pointless to criticize the critics of American education and its teachers for not having developed a solution to the problem of improving the quality of teaching. It is easy to point to alternative solutions which will guarantee a renovation in teaching.

But, as one reads the analyses of American education that have appeared in such abundance in the past decade, one cannot help but be struck by the lack of analysis of the fundamental changes which are occurring in American society which have had and will continue to have a profound effect on the character of teaching in our society. All of these analysts, critics, and reformers are socially sensitive and perceptive. All are aware of the profound changes occurring in American society. All have noted the many changes that universal education is producing in American society, yet, with few exceptions, most have failed to relate the directions in which American society is obviously moving to the kinds of changes that will be needed in teaching in the 1970's and 1980's.

A profound change has occurred in American society, a change more fundamental than the change from an agricultural to an industrial society. This change can be attributed to the provision of more education to large numbers of people. In the decades following World War II, America has moved from a manufacturing economy to a knowledge economy. The consequence has been a change in the nature of work in American society whose implications for education, and specifically for teaching, have been only dimly foreseen and are yet not fully understood. There is every reason to believe that focusing attention on this change in the nature of the American economy and society is essential if we are to understand what changes need to occur in American education.

If the critics, the reformers, and the analysts of American education in the past two decades can be faulted, it is for having offered classical and historical remedies to an emerging society profoundly different from any that has existed in history. Thus, those reformers who have urged that all teachers be liberally educated solved one part of a problem. But those reformers who urged this particular change have failed to see that the general education provided for the American college student is itself an anachronism. Those, like Silberman most recently, who urge open and creative systems in teaching, fail to give sufficient significance to the world into which the child will eventually emerge.

This paper begins with an analysis of the nature of American society as being rooted in a knowledge economy, the vast majority of whose citizens are knowledge workers. It raises the question: What kinds of teaching are needed in such a society? It proposes programs of research and development to develop the kinds of teachers that such a society will need in the next several decades.

THE CHANGE OF THE AMERICAN ECONOMY TO A KNOWLEDGE ECONOMY [1]

> In the last 20 years the base of our economy shifted from manual to knowledge work, and the center of gravity of our social expenditure from goods to knowledge.
>
> —Peter Drucker in *The Age of Discontinuity*

A knowledge society and a knowledge economy are not synonymous. A knowledge economy is, as its label implies, an economy in which knowledge is the chief product; in which knowledge is exchanged for profit. A knowledge society is one in which the social mores, customs, social relations, and systems for organizing work and leisure derive from the fact that large numbers of the members of the society are engaged in the work of the knowledge economy.

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[1] The ideas in this section are derived largely from Peter Drucker's, "The Age of Discontinuity: Guidelines Toward Our Changing Society."

The knowledge society has not fully emerged in American culture, but is rapidly developing. Those aspects of it which have emerged are not readily understood or perceived by many Americans; for example, the knowledge worker is the single most important source of capital investment in the United States, but, many Americans probably still believe that capital produced by commerce is the major source of money in this country.

What is a knowledge worker? A knowledge worker is a person who systematically applies knowledge to work. "Knowledge, like electricity or money, is a form of energy that exists only when doing work." (Drucker, p. 269)

The connotations of the term, "knowledge," when used in the phrase, "knowledge economy," or of the label, "knowledge worker," are limited. They may be understood by contrasting them to the way in which intellectuals generally use the word, "knowledge." To the intellectual "knowledge" means the discovering and acquiring of ideas, facts, and theories. Knowledge used in the sense of knowledge worker or knowledge economy is a more limited sense of the word. Knowledge in this context means the *application* of ideas, theories, principles, and facts to problems whose solution yields more effective work or generates new work.

The best and most widely known example is the use of knowledge to produce the achievements of the space program and all of its spinoffs. For example, the scientists in the space program were faced with the problem of developing heat-resistant materials with which to cover rockets. The successful solution to this problem has not only facilitated the "work" of the space program but also generated new forms of work by using these materials in a wide variety of applications such as in cooking utensils.

Computer scientists and computer programers are good examples of knowledge workers. The former develop new forms of computers to solve specific problems; the latter apply programing concepts to solve problems.[2] (Some computer scientists, like the mathematician or theoretical physicist, may not be interested in the application of computer-science concepts. But, since the relationship between basic research and theory and its applications is so well developed in this country, the basic scientist is usually regarded as a knowledge worker).

"The knowledge industries" in 1965 accounted for one-third of the national product; by the late 1970's, they will account for one-half of the national product. "Every other dollar earned and spent in the American economy will be earned by producing and distributing ideas and information, they will be spent on procuring ideas and information." (Drucker, p. 265) Also, the number of knowledge-workers will increase tremendously in the next 15 years. The teaching profession now constitutes the single largest sector of the occupational work force. The knowledge industry in the United States will need a million computer programers, a half million system engineers, system designers, and information specialists, and two million health-care professionals.

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[2] The two examples used here should not lead the reader to believe that the application of knowledge is confined to the natural and biological sciences. The social scientists are playing an increasingly important role in the economy. As Drucker has pointed out every aspect of every field of knowledge has developed some forms of application which are significant for the world of work. Drucker notes that even biblical scholar's knowledge is prized by the Israeli and Arabs. (Drucker, p. 266.)

THE SOCIAL CONSEQUENCES OF A SHIFT TO A KNOWLEDGE ECONOMY

There are many changes that have occurred as a consequence of our society becoming a knowledge society and our economy becoming a knowledge economy. Several of these are significant to note in this paper because they have implications for the organization of teaching and the training of teachers.

One of the more obvious and significant changes is the change in the level of education required for many jobs. As Drucker has pointed out, the character of the work has not changed correspondingly, but, the effect of requiring more years of schooling and expecting more years of education for a job has had profound effects on the expectations of a potential worker. He expects to use his acquired knowledge. In this respect, he differs markedly from the craft worker who has acquired a skill which he uses repeatedly, and who expects to benefit gradually from experience acquired over a period of many years. The knowledge worker, in contrast, comes to his work with a fund of knowledge that he expects to apply immediately. Unlike the craft worker, he expects to influence the nature of the work in which he is engaged and to produce significant changes in it. The craft worker expects to do his job essentially the same way over many years. If his job is modified it is usually by the application of knowledge by the knowledge worker.

Another change that has occurred is that the knowledge worker frequently is prepared for a second career at midpoint in his life. This consequence results in part from the expanded worklife of workers in American society. It also results from the kinds of needs knowledge workers have for continuous growth and stimulation. Even a knowledge worker's job can become routine for the knowledge worker when he has been at it for 20 or more years. Consequently, many knowledge workers need second careers in knowledge work when they reach their forties.

It is becoming apparent to many people that the pace at which knowledge is acquired in early years is much too slow, and that there is a need to acquire knowledge (or skill) at a greatly accelerated rate during the years of work. Dislocations in industries, or changes in national priorities, and inventions and discoveries create a constantly changing world of work. Skilled and semiskilled workers need to be retrained as the kind of work they do is replaced by new work. Knowledge workers themselves need to upgrade their knowledge; for example, psychologists trained in the thirties had to acquire the statistical techniques that first-year graduate students now learn in one semester. Many scientists in many fields are learning to use computers, not only for routine calculations but also for simulations of the processes they are trying to understand.

Perhaps the most profound change to have occurred in American society, although it is not as apparent as some of the other changes, is the value now being placed on knowing. A long history of anti-intellectualism in American society hides the fact that in recent years large numbers of Americans have been educated in college, that the knowledge acquired by these individuals is used so extensively throughout our economy that we can call it a knowledge economy, and that despite recurrent attacks on university systems no one would consider their destruction or a reeducation in their growth.

We have the most highly educated society in human history, one whose social forms are rapidly changing to accommodate the desires and needs of large numbers of literate and independent-minded individuals. This society is becoming more democratized. Authority is being diffused. Although there are status differentials in our society, we are creating a society that is classless[3] because the differences created by birth and heritage have been effectively eliminated by having all individuals achieve status through education.[4]

The basic commodity on which status is achieved is available to all. Thus, a new kind of society is emerging in which most of the members of the society work with their minds rather than their hands and in which this work equalizes the social status of the members. Responsibility and authority in such a society is more widely diffused, and is based on demonstrated achievement rather than class position. This society is so unique that we do not know how to organize it.

This new society faces two problems. First, we need to know how to organize the social and professional life of large numbers of knowledge workers. These knowledge workers are most effective in organizations; but, they have been educated for independence and initiative. Many of them presently feel constrained by the demands of an organization for cooperation, integration, and interdependence among knowledge workers. Also, such knowledge workers need a variety of incentives in addition to economic ones. The knowledge worker must have a challenge, opportunity for continued growth, and an opportunity to use his knowledge in what he regards as desirable ways. In all of these respects, he differs from the craft and skilled worker.

Our society is organized to maintain the craftworker, the individual professional, and the white-collar worker. One of our first problems will be to develop new life styles in organizations and new organizational arrangements which will facilitate the work of the knowledge worker.

Our second problem is to devise an educational system which stimulates the creation and development of more knowledge workers. In a knowledge economy, the success of the economy depends upon its ability to generate knowledge work. If, for example, knowledge in the field of computer programing were to remain constant, the activities of the computer programers would expand, but the growth rate in this knowledge industry would eventually stabilize. However, because we educate computer programers so that they generate new knowledge work, the growth rate in this knowledge industry will be exponential. A knowledge economy has, in principle, unlimited growth potential because a knowledge industry generates new knowledge or new applications of knowledge which in turn create knowledge work.

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[3] There will always be status differentials based upon achievement of goals valued by a society. In our society these achievements will usually be rewarded economically, but it is no longer possible to create classes out of these status differentials.

[4] Our society could become a two-class society in which the classes are divided on the basis of education. There is, at present, some distinction made along these lines because amount of education is correlated with economic rewards. It is likely, however, that such distinctions will be removed within the next 25 years. Integration of the schools was an important step in this direction. Further, making higher education available to more students is another step in this direction.

It is important to contrast what a knowledge economy will probably be like with a system based on manufacturing. Our social system is and has been one in which a relatively small number, and in some instances an absolutely small number, of individuals have developed new ideas or have invented technological devices that have had applications which created fields of work. The invention of a working light source called the light bulb, for example, stimulated the creation of an electrical industry. This industry has grown by distributing electrical energy in the form of light and heat to a wide variety of sources. The upper limit of the growth of this industry is a function of population growth and of finding new ways of using electricity. When everyone has adequate lighting and heating, the growth of the electrical industry will become stable. If population expansion is also controlled, it will cease to expand. Only if new applications of electrical energy are found, a task for the knowledge worker, will this industry continue to expand.

The use of computers is an example of another kind of knowledge industry. As the computer is used in new applications, new knowledge is generated about the process of applying computer concepts to problems, and new knowledge is generated about the computer itself as a mechanism. This new knowledge about the computer stimulates new applications of it in the solving of problems. These applications in turn generate ideas for other applications and for other uses of the computer. This knowledge industry has unlimited potential for growth because it constantly recreates itself in new forms which in turn create new kinds of knowledge work.

Contrast these two industries with the steel industry. This industry provides goods for uses which have remained unchanged for decades. The industry does use knowledge workers to improve its products and methods and to seek new applications. But, the industry does not produce knowledge work nor does it need large amounts of knowledge work performed within it.

It is the former types of industries and businesses which will dominate the economy in the seventies and eighties. These organizations will need very large numbers of knowledge workers.

The obvious conclusion is that a society built on a knowledge economy must have an educational system which provides knowledge workers. Does the American educational system provide knowledge workers at present? Yes, but in relatively small numbers. Large numbers of students are either untrained for knowledge work or are not trained to apply knowledge to generate either new knowledge or new knowledge work.

An example of the type of educated person who is not likely to become a knowledge worker or who will become a pedestrian and routine knowledge worker may be found in the large number of graduates from liberal arts colleges who have majored in fields such as history or English. These graduates find their way into teaching, journalism, and television. In the broadest sense, they are knowledge workers in these fields, but in a stricter sense, they are not knowledge workers. Their work requires them to use knowledge; they communicate knowledge; they acquire new knowledge; but, they do not systematically apply an organized body of knowledge to the solution of problems either because they do not know how to apply knowledge in solving problems or because they do not have the knowledge necessary to apply it to solving problems. Their education is irrelevant to their work.

The history major who becomes a teacher, for example, may do so by taking some courses in psychology and teaching methods, and by having some supervised teaching experience. Usually he becomes a journeyman teacher. He is not capable of inventing new teaching strategies or of coping with diverse teaching problems. He is most likely to lecture his students at greater or less length, devise fairly pedestrian ways of evaluating their performance, organize sporadic discussions, and occasionally engage in dialog with his students.

Similarly, an English major who goes into journalism or television knows very little about media. He has no systematic knowledge of the science of communication. He will learn the "trade" aspects of journalism and television on the job, but he too will be a routine worker who contributes nothing to the development of these media.

In both of the examples the student has been educated in a discipline in which he does not become a knowledge worker. He subsequently takes a job in which he cannot use the knowledge work skills he has acquired. He works in a knowledge work field or industry, but he is not a knowledge worker because he does not systematically apply knowledge to the solution of problems in his field. Many individuals working in knowledge work are more like the craft worker of old than they are like the knowledge worker in the knowledge industries.

Our society has large numbers of educated people who are likely to become the modern equivalent of the craft worker of old. These are people who have been educated in a field of knowledge which they do not use in their work. In many cases they are educated beyond their jobs. As we expand our system of higher education, we are producing more and more individuals of this kind. But we are not producing the kinds of knowledge workers that a knowledge economy needs for its continual development. We could within the next 25 years develop a highly educated population but see our knowledge economy stabilize. We will have lost the potential for exponential growth that is inherent in a knowledge economy because we failed to supply this economy with the kinds of workers it needs to continue to grow.

INQUIRY AND KNOWLEDGE WORK

It should be obvious to the reader that the concept of knowledge work used here implies a kind of activity that is like scientific research, or, more broadly, disciplined inquiry and problem solving.

A knowledge worker is a problem solver. But he is distinguished from the generally educated person who can solve problems or the person who in his practical experience has acquired problem solving skills because he applies a coherent and organized body of knowledge to problems. The work of a statistician or an economist provides relevant examples. (I exclude here those statisticians and economists who are primarily or exclusively interested in statistical or economic theory.) The statistician has a rich foundation in mathematics statistics, and the applications of both. Similarly, the economist has a rich foundation in economic theory and its applications. Each man works on problems for which he thinks his body of knowledge may provide ideas and information relevant to the solution.

The statistician may be given the problem of producing a system for controlling traffic in New York City during the rush hours. He may apply what he knows about queing problems to this problem. The economist may be asked to advise Columbia University on its investment policies to produce more income from its endowment. He may apply what he knows about the investment policies of large insurance companies to this problem.

The knowledge worker must have a foundation of information, concepts, theories, and knowledge of other applications on which to draw. But, he must have problem solving skills. His education must insure that he has both.

TEACHING AND INSTRUCTION IN THE KNOWLEDGE ECONOMY

It is useful to distinguish between teaching and instruction. *Instruction* is an activity from which a person learns and the activity is organized with the intent of facilitating learning. Reading a book, watching a television program, observing the flight of birds, working a mathematics problem, writing an essay are a few examples of many different activities which, if organized with the intent to produce learning, may properly be called instruction. *Teaching* is also instruction but it is that subcategory of instruction which employs a human person to organize and mediate the instruction.[5]

A teacher frequently does what also can be done by a book or a teaching program. He also supervises learning that is being mediated by books or machines or television. These are instructional activities, they are not teaching (see footnote 5).

Teaching is those instructional activities which only a human person can perform. Although we do not understand well what is likely to be unique to the human instructor, we do have some ideas of the instructional activities that only a human can perform.

HEURISTIC TEACHING

Heuristic teaching is a concept used to describe what the teacher does uniquely in instruction. In general, the teacher can stimulate and mediate processes whose components are interdependent, do not follow a necessary sequence, are not time-dependent, and whose internal logic is obscure—in short, he mediates those processes which result in thinking and refined feeling. They are processes in which a person learns to learn as he learns. Our ways of conceptualizing these processes are far from being well formulated. Only one model has been proposed to date to describe them. (McDonald, 1971).

An example may help. A student wishes to undertake research on the effects of using drugs on interpersonal relations. He may have only a very general idea intially, one so vague as, I wonder what drugs do to you. Beginning with this vague idea, he must shape a more specific one, such as the question about the nature of interpersonal relations in the drug culture, and eventually formulate questions whose answers he can find or hypotheses whose validity he can test.

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[5] This distinction is a common one but not a universally accepted one. Unfortunately, the denotations and connotations of these terms are practically identical. But, we need to make a distinction between what only a human person can do who instructs and what a book or a computer can do which also instructs. Here I arbitrarily call what the human person can do uniquely when he instructs, teaching; what both man and machine can do when they instruct, I call instruction.

A student may think through these questions for himself, but usually he will be working with an advisor, his teacher. The interaction between student and teacher will take many forms. The teacher will ask questions, he will give advice, he will suggest books and articles to read, he may suggest that the student talk to drug users to get the feel of the problem; even his silences, or the ideas on which he does not choose to comment, have significance. His goal is to stimulate the student's thinking so that the student does the work of sharpening his ideas for himself.

The more important aspect of this interaction is what the student is learning about this kind of thinking. He learns the process and skills of critical thinking which will help in working on other problems and questions. He is becoming a skillful inquirier. He is learning to learn.

Heuristic teaching refers to styles of teaching which emphasize the development of self-initiated and self-directed pupil learning; which stress the pupil's discovering rather than absorbing knowledge; which place the student in the role of the inquirer; which aim at heightening the relevance of school to the pupil's life; which are concerned with the emotional and social development of the pupil as well as with his cognitive growth. Teaching in the heuristic mode represents no one style of teaching behavior or activity. It may be characterized as imbued with the spirit and mood of inquiry, critical skepticism, invention, imagination, and enthusiasm for learning It treats students as persons who can produce knowledge and understanding. It is revealed in sets of beliefs about the way in which knowledge and understanding are integral to personal development and the meaning of existence. It may be the essence of the varied styles of great teachers to inspire students to seek understanding.

We will not attempt here to describe in detail all that is meant by heuristic teaching. One way to understand more clearly what is implied in this concept is to look at heuristic teaching from the perspective of the teacher and then from the perspective of the student.

The teacher himself is an active inquirer, making the learning process itself a subject of his inquiry. Teaching is the means by which the teacher himself learns; he is as actively engaged in learning as his students.

He stresses openness of inquiry. He does not make arbitrary distinctions between knowledge and living, between understanding and being, between social importance and personal relevance. He helps students seek knowledge and understanding; he does not think of teaching as giving knowledge and understanding.

The character of his relations with students is different. He appeals to the authority of free inquiry rather than to the authority of persons. He does not impose his greater knowledge or deeper insight on students, but relies on their perceptions of his competence to stimulate them to seek him out as a guide.

The characteristic behaviors of students taught with heuristic-teaching styles also takes many forms. The student is an active inquirer rather than a passive recipient of knowledge. He sees the process of learning as a way of achieving his most significant personal goals. His definition of his goals, of what in life will have significance for him, emerges out of the processes of learning. He also does not make an arbitrary distinction between being and learning, between personal relevance and education, between meaning and personal significance.

He assumes responsibility for his learning. He does not need to be goaded to learn, since the significance of learning has become intimately personal for him. He views education as a means of achieving his goals. He sees teachers not as threats to his personal integrity but as helpers in achieving and enhancing it (McDonald, 1970).

HEURISTIC TEACHING AND THE KNOWLEDGE-ECONOMY

The knowledge-economy needs persons who are informed and who have inquiry skills. It needs a school system which educates such persons in large numbers. It needs, therefore, a school system in which heuristic teaching is a significant, if not the predominant, teaching style; in which problem solving is the principal activity, and in which the acquisition of inquiry skills is the expected outcome.

American educators have struggled for 50 years with variable enthusiasm and energy to orient instruction around problem solving. There are many reasons why their efforts have not been successful. But, it is now apparent that unless the school is reorganized around problem solving, it will not produce the intellectuals and knowledge workers that will be needed in our emerging society. It will become increasingly wasteful of the money invested in it. If students do not bring back to our society the skills needed to foster its growth, their education will be wasted.[6] It will destroy itself as it forces students to engage in meaningless tasks and to learn information whose purpose is not clear and which rapidly becomes obsolete and irrelevant.

There are many problems to be solved to reorient the schools to teaching the most human of all skills. The problem is how to introduce into the schools the kind of teaching that will make for the most intellectually, socially, and economically productive student. Even though we have only general concepts on what this teaching should be like, effective research and development can solve the many problems of describing this teaching and its effects, of how to train teachers to use this teaching style, of how to organize a curriculum that requires it, and of how to help students to adapt to it.

That research is badly needed is attested by one fact. There are only three references in the educational research literature of the past 75 years that describe problem solving teaching performances. (McDonald and Quirk, 1971.) There is much philosophical and hortative literature but practically no descriptive or empirical studies.

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[6] Some of today's students and professors argue that our educational system is too closely tied to our economic system and to its social mechanisms. This view has a factual basis but it is limited and somewhat naive. Job training or vocational training may or may not produce a knowledge worker; it may or may not emphasize learning inquiry skills. To the degree that it does not produce knowledge workers nor emphasize the learning of inquiry skills, this criticism of the linking of the educational system to the economic system is just. But, it is naive to think that education can be divorced entirely from the society in which it exists or that acquiring an education will not have social and economic consequences. A knowledge society, the one into which we are emerging, can be sustained only if the society reaps a "return" from what students have learned. Although we do not know all of the social and moral consequences of creating such a society, it appears to have more potential for greater human development than any that have preceded it.

NEEDED RESEARCH AND DEVELOPMENT PROGRAMS

The method usually proposed for renovating the schools' programs is to change the curriculum by introducing new content or giving teachers special training. Such efforts have not always been notably successful, but, even if the defects of previous efforts are eliminated, these ways of changing the school are relatively slow.

Earlier in this paper we pointed out that many knowledge workers are looking for and need a second career. Some are going into teaching, but when they do, they may not utilize their inquiry skills and ability to apply knowledge to problems; too frequently, they become just more information distributors who after a few months are indistinguishable from teachers who have been teaching for decades. Since there are substantial numbers of these knowledge workers available, the shift from the didactic teaching styles of the schools to the heuristic teaching styles required for our emerging knowledge society may may be accomplished more quickly by infusing significant numbers of these knowledge workers into the educational system. They could be rapidly trained for a second career in teaching or some of them could be trained to work part time in the schools.

This training should have as its goal to utilize the special talents of these knowledge workers; it should not be aimed at fitting them into the system. It should also be relatively brief, 6 months on a typical college schedule or 3 months of intensive training.

One of the goals of the training should be to help these knowledge workers develop teaching procedures and curriculum content for learning experiences that will teach the application of knowledge and foster the learning of inquiry skills. We can assume that these workers have ample and rich experience in finding and solving problems. Their goal should be to teach others the skills of finding and solving problems, the skills of using knowledge to generate more knowledge, and the skills of applying knowledge.

Their educational program should be primarily the work of designing methods and content for new kinds of courses or learning experiences that emphasize inquiry learning and problem solving and that utilize heuristic teaching styles. They ought also to plan and conduct research on the proposals, and to plan and conduct the evaluation of what they proposed to do.

They ought not to be trained to be a chemistry teacher or an English teacher. A scientist, for example, might take ecological problems as a starting point and develop a program to study the scientific, technological, and economic aspects of these problems. A television producer might design a course to develop new kinds of television programs, or new ways of using television. The work would be a genuine educational experience because it would demand problem-solving skill and intellectual and technical knowledge.

The infusion of persons of this caliber doing the kinds of work suggested here would revitalize the schools. The curriculum would be "relevant" in the best sense of the word. The problem of relating the work of the school to the problems of today would be solved in a way that today's professors and teachers could not solve by bringing the world's problems into the school in the person of an individual who knows the problems and methods for attacking them. Such experiences would engage students in learning that had meaning for them. These new teachers would bring vitality, experience, and a fresh look at educational problems.

A second kind of program should involve these knowledge workers in the training of teachers. The same kinds of activities proposed above can be adapted to teacher training. The goal, in this case, is that knowledge workers be used to educate prospective teachers to use inquiry skills in developing their teaching strategies, and to teach them how to design inquiry-oriented lessons and programs. The knowledge workers would design courses to train teachers for heuristic teaching; they would also design evaluations of these training programs.

The above two proposals apply a well substantiated psychological principle of learning. A model of what is to be learned is a most effective teaching tool. Students, teachers, and administrators would see what they now rarely see, a problem solver applying his knowledge to resolve real problems.

These programs for moving knowledge workers into the educational system must be accompanied by a research program that has three components: (*1*) *research on the effects of heuristic teaching behavior on student learning;* (*2*) *research on the measurement of heuristic teaching behavior;* (*3*) *research on how heuristic teaching behavior may be learned.* Extensive research in these areas is needed because we know so little about complex teaching performances like heuristic teaching, its effects on students, their receptivity to it, which teachers can learn this teaching style, how to train teachers to use it, and what materials and content will be needed to use it.

A research program is needed to assess the effects of introducing knowledge workers from other fields into the educational system. This change should have substantial effects on the organization of teaching (the amount of responsibility this new kind of teacher will be given and will assume, the nature of their work), the character of teaching and teacher-student interactions, and the curriculum. We need to know what problems these teachers will face, how they adapt to them, and how the innovations they propose work. The system for training these knowledge workers should be the starting point for a comprehensive program of research and development that will improve the selection and training of these knowledge workers, will facilitate their entrance into and retention in the teaching profession, and will support the use of the techniques, programs, and materials they devise for training the next generation of knowledge workers.

A research and development program is needed to reform certification processes. At present, schools of education are little more than recruiting agencies which take in students, usually by applying no other criteria than those used to select college students, and with little more than a semester of poorly supervised teaching experience and some psychology and methods courses, graduate them into the teaching profession with a teaching certificate. This deplorable system has been denounced, criticized, and attacked for decades and by numerous and varied persons. It has changed very little. If it does not change, the proposals made in this paper cannot be carried out.

Two movements offer some hope for change. There is a movement to base certification on demonstrated teaching performance. To achieve the goals of this movement, research and development is necessary on performance-based measures of teaching competence. The States should be helped to experiment with revising their certification systems, and should be given the necessary research and development funds to mount a program to reform their certification systems.

A second movement is to differentiate the functions of the teacher and to break the teaching role up into its components. Either the teacher's abilities or the nature of the teaching task will be used to assign teachers to those aspects of teaching for which they have the necessary skill and training. Such a system differentiates the teaching staff and provides rewards, opportunities, and responsibilities commensurate with the teaching task or function undertaken.

Both of these movements must succeed if the kinds of knowledge workers described above are to be moved into the educational system. At present, they could not easily obtain certification nor would they assume a role of the kind proposed for them. They would be required to take traditional teacher training courses and would be assigned traditional teaching tasks. They would be an affront to their knowledge and experience, to their maturity, and to their ability to assume responsibility. This prospect would and does discourage many of them from moving into teaching. If we are to move large numbers of knowledge workers into our educational system, we must change both the methods of certifying them and the functions they will undertake. We must offer them challenge, opportunity, and responsibility. If we do not move them into our educational system soon and in large numbers, we cannot hope to prepare the knowledge workers that our society will require.

This paper has proposed that we turn our attention to infusing the educational system in the next decade with large numbers of knowledge workers to meet the demands of a knowledge economy and the needs of a knowledge society. I have argued that unless we do so we will not solve the problems of this emerging society nor will we capitalize on its potential for growth.

These knowledge workers will reorient the educational system so that it emphasizes problem solving, learning inquiry skills, and applying knowledge systematically to solving problems. They will devise heuristic teaching styles and the methods and materials necessary to use such styles. We cannot train a generation of knowledge workers if the only teaching methods used in the schools emphasize didactic teaching styles.

Changes of the kind proposed need three kinds of research and development: research and development on heuristic teaching styles and problem solving teaching performances and their effects; research and development on the measurement of heuristic teaching behavior; and research on learning heuristic teaching behavior. We need research also on how knowledge workers may be retrained to enter the educational system, how they adapt to it, how their entrance into it changes the system, and how the innovations they propose work.

Changes of this kind cannot be accomplished if we do not change the system for certifying teachers and the character of the teaching role. The States should be helped to reform their programs and school systems and training institutions should be stimulated to modify the teaching role and to train individuals to carry out specific teaching functions in staffs composed of individuals of diverse skills and responsibilities.

The educational system needs reorientation. It must shift to educating children for a society that is emerging, one with which we have had little experience, and one that will require many changes in how we organize the world of work and our other social systems. We are becoming a knowledge society. The educational system must prepare our children to live in that society and to nourish it. It must prepare them to understand it and to develop and control it. The proposals made here are designed to change the educational system quickly to meet these challenges.

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MEASURING WHAT LEARNERS LEARN [1]

(With a Special Look at Performance Contracting)

BY ROBERT E. STAKE

"Can there be teaching if there is no learning?" Hear again one of the lines from the educator's catechism. The question is not to be taken literally. Good teaching, elegant teaching, without student benefit, of course is possible—though doubly wasteful. The question is rhetorical. Professionals and laymen alike sanctify that teaching-learning contract that results in better student performance.

Measuring the learning is no small problem. Teachers, as a matter of course, usually are able to observe that individual students are or are not learning. Sometimes they cannot. And increasingly, outsiders are reluctant to take the teacher's word for it. Gathering "hard-data" evidence of student learning is a new and ominous challenge. Of course, we have tests. But the results of our testing have seldom been adequate grounds for the continuing faith we have in education.

Present demands.—Expectations of testing are on the rise because schools have been told to be accountable—to demonstrate publicly what they are accomplishing (Lieberman, 1970; Bhaerman, 1970). Increasing educational costs and increasing frustration with social and political problems have brought higher demands for answers to an important question: What are we getting for our education dollars?

Educators have been challenged to become more explicit and more functional in lesson plans and school budgets; to identify the gains and losses children make in reading, singing, and the many human talents; and to realize that the events of the classroom are not unrelated to the events of the street, the marketplace, and city hall (Cohen, 1970). Educators have been told to learn about systems analysis, operations research, cost-benefit analysis, program planning and budgeting, and other models for orderly and dispassionate treatment of institutional affairs (Lessinger, 1970).

Some critics of contemporary education are bothered greatly by the fact that educational practice is so intuitive, impulsive, inefficient, and resistant to change. Others continue to be bothered more by passionate but naive efforts to substitute technical procedures for personal attention. Thorndike (1921), Tyler (1950), and Krathwohl (1969) have been persuasive advocates of a more rational, explicit, performance-oriented school. But Atkin (1968), Oettinger (1969), and Dyer (1970) have cautioned that formal analyses and production models can be narrow, irrelevant, and even oppressive. It is safe to say that all specialists in testing and instruction believe that it is possible to measure many specific educational outcomes and to use such measurements in improving educational decisions. But a few of these same specialists are among the most vehement critics of present testing (Glaser, 1963; Grobman, 1971).

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Tests for performance contracts.—The performance contract is an agreement between a group offering instruction and a school needing service (Lennon, 1971). Reimbursement is to be made in some proportion to measured student achievement. Especially for children having special needs, such as nonreading, handicapped, or gifted children, a new way of getting special instruction is appealing. A hard-data basis for evaluating the quality of instruction is appealing. In performance contracting student gains are the criterion of successful teaching.

In the first federally sponsored example of performance contracting for the public schools, Dorsett Educational Systems of Norman, Okla., contracted to teach reading, mathematics, and study skills to over 200 poor performance junior and senior high school students in Texarkana, Tex. Commercially available, standardized tests were used to measure performance gains.

Are such tests suitable for measuring specific learnings? To the person not intimately acquainted with educational testing it appears that performance testing is what educational tests are for. The testing specialist knows that this is not so. These tests have been developed and administered to measure correlates of learning, not learning itself.

Most tests are indirect means of educational gains, correlates of learning rather than direct evidence of achievement. Correlation with important general learning is often high, but correlation of test scores with performance on many specific educational tasks is seldom high. Tests can be built for specific competence, but there is relatively little demand for them and many of them do a poor job of predicting later performance of either a specific or general nature. General achievement tests predict better. The test developer's basis for improving tests has been to work toward better predictions of later performance rather than better measurement of present performance. Assessment of what a student is now capable of doing is not the purpose of most standardized tests. Especially when indirect measurement tests are used for performance contracting, but even with direct assessment tests, errors and hazard abound.

In this paper I will identify the major obstacles to direct measurement of the specific things that learners learn.

THE ERRORS OF TESTING

Answering a National School Board Journal (November 1970) questionnaire on performance contracting, a New Jersey board member said, objectives must be stated in simple, understandable terms. No jargon will do and no subjective goals can be tolerated. Neither can the nonsense about there being some mystique that prohibits objective measurement of the educational endeavor. Would that our problems would wither before stern resolve. But neither wishing nor blustering rids educational testing of its errors. They exist.

Just as the population census and the bathroom scales have their errors, educational tests have theirs. The technology and theory of testing are highly sophisticated; the sources of error are well known

(Lindquist, 1951; Cronbach, 1969). Looking into the psychometrist's meaning of "A Theory of Testing," one finds a consideration of ways to analyze and label the inaccuracies in test scores (Lord, 1952). There is mystique, but there is also simple fact: No one can eliminate test errors. Unfortunately, some errors in testing are large enough to cause wrong decisions about individual children or about school district policy.

The whole idea of educational testing is thought to be an error by some educators and social critics (Hoffman, 1962; Holt, 1969; Silberman, 1970; Sizer, 1970). Bad social consequences of testing, such as the perpetuation of racial discrimination (Goslin, 1970) and pressures to cheat (McGhan, 1970) continue to be discussed. But, as would be expected, most test specialists believe that the promise in testing outweighs these perils. They refuse responsibility for gross misuse of their instruments and findings; and they concentrate their attention on reducing the errors in specific tests and test programs (Lennon, no date).

Some technical errors in test scores are small and tolerable. But some testing errors are intolerably large. Today's tests can, for example, measure vocabulary word recognition skills sufficiently accurately. Today's tests cannot adequately measure listening comprehension or the ability to analyze the opposing sides to an argument.

Today's test technology is not refined enough to meet all the demands put on it. The tests are best when the performance is highly specific—when, for example, calling for the student to add two members, recognize a misspelled word, or identify the parts of a hydraulic lift. When a teacher wants to measure performances calling for the higher mental processes (Bloom et al., 1956), such as generating a writing principle or synthesizing a political argument, our tests give us scores that are less dependable. See table 1 for several examples.

TABLE I.—*Examples of Items of High and Low Validity in Conventional Standardized Achievement Tests*

High validity—basic mental process items:

*1. Which one of the following phrases about wave motion defines period?
- (*a*) The maximum distance a particle is displaced from its point of rest;
- (*b*) The length of time required for a particle to make a complete vibration;
- (*c*) The number of complete vibrations per second;
- (*d*) The time rate of change of distance in a given direction.

*2 Directions: In each group below, select the numbered word or phrase which most nearly corresponds in meaning to the word at the head of that group, and put its number in the parenthesis at right. ( ) antelope. (*a*) Fruit; (*b*) animal; (*c*)prelude; (*d*) feeler; and (*e*) gallop.

*3. The first movement of a sonata is distinguished from the others by:
- (*a*) Rapidity and gaiety;
- (*b*) Length and complexity;
- (*c*) Emotional abandon;
- (*d*) Sweetness and charm; and
- (*e*) Structural formality.

4. Which of these would help you decide whether or not you used the word filter correctly in a sentence?
- (*a*) Encyclopedia;
- (*b*) Dictionary;
- (*c*) Thesaurus; and
- (*d*) English grammar textbook.

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*From Bloom et al., 1956; reproduced here with permission.

Lower validity—"higher mental process" items:

*5. A and B were arguing about the desirability of adopting a nationwide system of compulsory health insurance in the United States. B said that, while he had no fundamental objection to health insurance, he felt strongly that people should not be compelled to participate in it. "Now look here," he said, "Do the people want health insurance or don't they? I don't think they do, but in either case, compulsory insurance is bad. If the people really want health insurance, there is no need for compulsion. If they don't want it, it is impossible to force them to participate. So the answer is clear."

Which of the following statements most nearly expresses the logical conclusion of B's argument?

(*a*) Health insurance is bad.
(*b*) Compulsory health insurance is bad.
(*c*) Compulsion is impossible.
(*d*) Compulsion is unnecessary.
(*e*) Compulsion is either unnecessary or impossible.

**6. Directions: In each situation below, you are given introductory information about a person's action or conclusion. This is followed by several independent statements of evidence. Decide whether the added information in each statement makes it more or less probable that the action or conclusion is correct. For each statement, mark the answer space under *a* if the added information makes it more probable that the conclusion is correct; under *b* if the added information makes it less probable that the conclusion is correct; under *c* if the added information makes it neither more nor less probable that the conclusion is correct.

Situation: I predict that our team will win the basketball tournament next week. With the exception of one player, our team is the same as last year when we won easily. Furthermore, we have a 13–3 won-lost record this season.

Statements:

(*a*) Another team in the tournament has been undefeated against substantially the same teams.

(*b*) Our closest competitor will be relying mainly on sophomores to carry it to victory.

(*c*) The first game will be played Monday morning instead of Monday afternoon as previously announced.

Unreached Potentials. Many educators feel that the most human of human gifts—e.g., the emotions, the higher thought processes, interpersonal sensitivity, moral sense—are beyond the reach of psychometric testing. Most testing specialists disagree. While recognizing an ever-present error component, they believe that anything can be measured. The credo was sounded by E. L. Thorndike (1918):

> Whatever exists at all exists in some amount. To know it thoroughly involves knowing its quantity as well as its quality. Education is concerned with changes in human beings; a change is a difference between two conditions; each of these conditions is known to us only by the products produced by it—things made, words spoken, acts performed, and the like. To measure any of these products means to define its amount in some way so that competent persons will know how large it is, better than they would without measurement. To measure a product well means so to define its amount that competent persons will know how large it is, with some precision, and that this knowledge may be conveniently recorded and used. This is the general "Credo" of those who, in the last decade, have been busy trying to extend and improve measurements of educational products.
>
> We have faith that whatever people now measure crudely by mere descriptive words, helped out by the comparative and superlative forms, can be measured more precisely and conveniently if ingenuity and labor are set at the task. We have faith also that the objective products produced, rather than the inner condition of the person whence they spring, are the proper point of attack for the measurer, at least in our day and generation.

**From "Analysis of Learning Potential," Form A, 1970, published by Harcourt Brace Jovanovich, Inc.: reproduced here with permission.

> This is obviously the same general creed as that of the physicist or chemist or physiologist engaged in quantitative thinking—the same, indeed, as that of modern science in general. And, in general, the nature of educational measurements is the same as that of all scientific measurements.

Testing men believe it still. They are not so naive as to think that any human gift will manifest itself in a 45-minute paper-and-pencil test. They believe that, if given ample opportunity to activate and observe the examinee, any trait or talent or learning that manifests itself in behavior can be measured with reasonable accuracy. The total "cost" of measuring may be a hundred times that of administering the usual tests, but they believe it can be done. The final observations may rely on professional judgment, but it would be a reliable and validated judgment. The question for most test specialists then is not "Can complex educational outcomes be measured?" but "Can complex educational outcome be measured with the time and personnel and facilities available?"

If we really want to know whether or not a child is reading at age-level, we have a reading specialist listen to him read. She observes his reading habits. She might test him with word recognition, syntactic decoding, and paragraph-comprehension exercises. She would retest where evidence was inconclusive. She would talk to his teachers and his parents. She would arrive at a clinical description which might be reducible to such a statement as "Yes, Johnny is reading at or above age-level."

The scores we get from group reading tests can be considered estimates of such a clinical judgment. These test scores correlate positively with the more-valid clinical judgments. Though more objective, such estimates are not direct measurements of what teachers or laymen mean by "ability to read." Achievement gains for a sizable number of students will be poorly estimated by them. It is possible that the errors in group testing are so extensive that—when fully known—businessmen and educators will refuse to accept them as bases for contract reimbursement.

Professional awareness.—Classroom teachers and school principals have tolerated standardized test errors (as much as they have) because they have not been obligated to make important decisions on the basis of test scores alone. Actually, it is seldom in day-to-day practice that they use test scores (Hastings, Runkel, and Damrin, 1961); but, when they do, they use them, in combination with other knowledge, to estimate a child's progress in school and to guide him into an appropriate learning experience. They do not use tests as a basis for assessing the quality of their own teaching.

In performance contracting the situation is supposed to be drastically changed. Tests are indicated as the sole basis for contract reimbursement. The parties must decide how much to pay the contractor for instructing each child. An error in testing means money misspent. Graduation and reimbursement decisions are to be made without reliance on the knowledge and judgment of a professional observer, without asking persons who are closest to the learning (i.e., the teacher, the contractor, the student) whether or not they see evidence of learning. They are to be made entirely by objective and independent testing. The resulting human errors and technical misrepresentations will be numerous. On the following pages I will discuss four major hazards:

(1) attending to the wrong objectives, (2) selecting the wrong tests, (3) misinterpreting the test scores, and (4) adding to the depersonalization of contemporary life.

CHOICE OF OBJECTIVES

I am addressing this paper to the measurement of objectives already specified. It is important to recognize that at no time—in any real educational practice—are instructional objectives completely and finally specified.

No statement of objectives is final. Changes in aim, as well as changes in priority, occur throughout training even in the more highly structured instructional programs. Some people feel that this is what is wrong with much classroom instruction: It cannot pick a target and stay fixed on it. But other people are convinced that classroom instruction is too fixated, too inflexible, that teachers are too unwilling to adapt to the changing goals of students and society.

No statement of objectives says exactly what it ought to. Every statement has its ambiguity; each word can be misunderstood; we cannot expect any list to say exactly what its authors want it to. Verbal statements of objectives cannot perfectly represent human purposes. All this does not mean that educators should not state their objectives, but it does mean that educators should continue to look for better ways of representing their objectives. They should expect them to change from beginning to end of semester and beyond. They should regard any statement as an approximation. Objectives remain in flux, never completely free of misrepresentation by our tests and observations, in even the most stable curricula.

Specification benefits.—Identifying the goals of education in formal, rational terms is recognized as a powerful way to change professional practice (Tyler, 1950; Mager, 1962). To recognize that objectives will change is not to argue that they should not be stated in advance of training. An awareness of purpose by both teacher and student is usually desired. Only occasionally will an educational experience be highly successful if there is no advance expectation as to what should occur. Usually the activity will be improved if the opportunity to learn is deliberately provided for. Often instruction will be improved if lesson plans focus on desired behaviors rather than entertain spontaneous interests and distractions.

Outside evaluation of the success of instruction is made much simpler and possibly more effective by the prespecification of objectives. Popham (1969) has identified these and other benefits that accrue to those who state their instructional objectives in advance and stick to them.

Specification costs.—But each of these possible benefits carries with it a cost. Stating objectives properly is a lot of work. Some other possible costs are less obvious. In each of the next six paragraphs I will identify an important cost that may be incurred in specifying objectives prior to training.

To specify what is to be accomplished always fails to represent the sum total of what is desired. Language fails to portray exactly what we want. The error may be small and unimportant, or it may not. But to some extent there will be a misrepresentation of purpose.

The singularity of any list of objectives—even if it has 100 separate objectives—disregards the disparity in what teachers, students, and citizens need and want. In a pluralistic society, different people have different priorities. Gooler (1971), for example, found that teachers put more emphasis on humanistic curricular objectives than parents do. In his article in the Saturday Review last fall, Schrag (1970) said:

> Any single, universal public institution—and especially one as sensitive as the public school—is the product of a social quotient verdict. It evaluates the lowest common denominator of desires, pressures, and demands into the highest public virtue. It cannot afford to offend any sizable community group be it the American Legion, the B'nai B'rith, or the NAACP.

Publicized statements of objectives are likely to represent nobody's objectives.

Any public display of educational goals evokes political and social reaction (Lortie, 1967). Educators—as other people—are seldom candid in the face of hostile criticism. They are likely then to state (and possibly emphasize in the classroom) objectives that are less controversial. Pressure to state objectives is transformable into pressure to change objectives.

The schools presently pursue many more objectives than any educator can specify, more than he chooses to admit (Gooler, 1971). The results of a specification of objectives, for good or ill, is to increase substantially the emphasis on some objectives and to decrease substantially the emphasis on others. Some objectives are more easily specified and more easily measured than others. It is almost centain that easy-to-measure objectives will get increased emphasis when a statement of objectives is drawn up.

The language of behavioral specification is such that behavioral processes (recalling, solving, writing, observing, etc.) are given greater emphasis as to what the school will do; and subject matter (the Civil War, use of quotation marks, conservation of energy, the nature of knowledge, etc.) will get less. Gagné has claimed (1967, p. 21) that subject matter is preserved to any desired extent by behavioral objectives: but the AAAS Elementary Science Curriculum—its creators relied heavily on his counsel—is a curriculum which attends relatively little to the traditional categories and relationships of science. Increased emphasis on performance is likely to bring decreased emphasis on content.

Furthermore, when curricular objectives are spelled out in advance, it is more difficult for a teacher to seize an opportunity to teach something the students obviously are ready for and wanting to learn (Atkin, 1968). And it is more difficult for a teacher to assign needed remedial work when the schedule, and perhaps the syllabus, call for completion of specific units.

The listing of tradeoffs could go on. There are many things that happen when you try to state educational objectives in simple, understandable terms. McNeil (1967), Jenkins and Deno (1969), Eva Baker (1970), and Zahorik (1970) carried out empirical studies to examine the good and bad effects of specification and planning. Improved student performance on the specified objectives in some circumstances appears to be attributable to the specification itself. But Zahorik found that planning resulted in less attention to immediate concerns of the pupils. More research on the overall effects of specification is needed.

For each effort to identify more specifically what will be learned, to identify it earlier, and to identify it formally as a statement of instructional objectives, it seems that there are both potential benefits and hazards for the ongoing instructional process.

CRITERION TESTING PROCEDURES

Among test developers the most vexing problem has always been the criterion problem, the problem of correlating test scores to a true criterion. For validating a new test, the developer needs to ascertain that at least for a small, carefully measured reference group of students there is a high correlation between what the test measures and what is already known about that group that the test is supposed to indicate. A high correlation signifies that for that criterion chosen, the test is valid. The high scorers on a study-skills test, for example, would be the students who independently and by direct observation are judged to have the best study capabilities. True criterion observations—whatever the criterion might be—are not readily available on most students. Because of the difficulty and expense, any one standardized test will be validated against only one, or a very few, criterion variables. The most common criterion variable is a course grade given by a teacher or a grade-point average.

For performance testing, the standardized test—the right, already-validated, standardized test—is not likely to exist. The purposes of the contracted-for instruction are relatively sharp, e.g., to increase reading speed and comprehension—and the available tests have been validated against a more general criterion, e.g., grades in reading. The educator has a choice between using a not-quite appropriate available test and building an expensive and questionably valid test. The problem is a vexing one: how to select or construct the appropriate items, observations, or test to serve as the criterion of learning for the purpose of the contract.

Three questionable aspects of the criterion test need careful thought. There is: (1) a question about relying on performance as a criterion indicator of benefit from instruction, (2) a question about measuring complex performances with simple tests, and (3) a question of teaching for the test. The first two are related to hazards in the choice of objectives as described in the previous sections.

Savings.—An objection to the performance test is that it does not reveal one of the outstanding benefits of instruction: savings. In learning-research jargon, savings is the increased ease of relearning something just because it was studied before. Whether or not a student learns something to mastery level, he usually forgets some or all of it. When he needs to know it, in school or out, he usually has an opportunity to relearn it. Immediate recall is just not as important as test designers assume.

It is usually much easier to learn the second time than the first. It is, of course, easier to learn on that later occasion than it would have been had the learner not studied the lesson before. Sometimes it is easier because the learner knows how to go about learning it the second time. This savings is an important benefit from instruction. Learning how and when to use reference sources for particular topics is a major, but poorly recognized, instructional objective. Such learning shows up as savings. Savings and long-range retention are among several things,[2] in addition to immediate retention performance, that should be looked at in deciding whether or not instruction deserves reimbursement.

Complex performances.—It is unrealistic to expect that a project director can find or create paper-and-pencil test items, administrable to large numbers of students in an hour's interval—by persons untrained in psychometric observation and standardized diagnostics—objectively scorable, valid for purposes of the performance contract, and readily interpretable. The more complex the training, the more unrealistic the expectation. One manner of compromise is to substitute criterion-test items measuring simple behaviors for those measuring the complex behaviors targeted by the training. For example, the director may substitute vocabulary-recognition test items for reading-comprehension items, or knowledge of components in place of actual dismantling of an engine.[3] The substitution may be sound, but the criterion test should be validated against performances directly indicated by the objectives. It almost never has been.

It would be unrealistic to expect that the benefits of instruction will be entirely apparent in the performances of learners at test-taking time. The tests to be used probably will evoke relatively simple behavior. Ebel (1971) said:

> Most achievement tests . . . consist primarily of items testing specific elements of knowledge, facts, ideas, explanations, meanings, processes, procedures, relations, consequences, and so on.

He went on to point out that more than simple recall is involved in answering even the simplest vocabulary item.

Much more complex behavior is needed for answering a reading-comprehension item. An example of an excellent reading-comprehension item, from the "Iowa Tests of Basic Skills," is shown in table 2. The items here are clearly calling for more than the literal meanings of the words read. The student must paraphrase, interpret—what we expect readers to be able to do.

TABLE II.—*A Passage and Ten Questions To Measure Reading Comprehension* *

Paragraph 1.—When your teacher says "O.K.," you know that all is well. Do you know how we happen to use two letters of our alphabet for words? Do you know the words for which the two letters stand?

Paragraph 2.—The custom of using O.K. to mean that all is correct is now 100 years old. It began during the election year of 1840. William Henry Harrison, a candidate for president, came to Urbana, Ohio, to make a speech. A large number of people went out to meet him. When they returned to town, one of the wagons carried a large banner on which was written, "The people is oll korrect." The spelling, of course, was wrong; the sign meant "all correct."

Paragraph 3.—The enemies of General Harrison made fun of the poor spelling of his friends. Harrison's friends, however, used the saying to advertise their candidate. They said he was the candidate of the common man. Since many people of that day could not spell well, saying that Mr. Harrison's friends could not spell made him still more popular with the common people. Soon, instead of saying "oll korrect," people were saying just "O.K."

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[2] Others: (1) improving typical as well as maximal behavior; (2) developing awareness of contexts where special skills are needed; (3) increasing structure and organizers for learning; (4) provision of opportunity to learn; (5) increasing desire to learn; (6) use of good adult models; and (7) treatment of students with dignity and humanity, and so forth. Perhaps the school officials should be paid a bonus if they identify an appropriately broad set of objectives or fined if they do not.

[3] Tendencies to teach for the test in this situation must be checked.

Paragraph 4.—After the election Daniel Leffler, an innkeeper of Springfield, Ohio, put a sign over the door of his house which read, "The O.K. Inn." This inn was on the great national road. Many people stopped to eat and many others saw the strange sign is they drove by. Harrison had been elected president, and people remembered the "Oll Korrect" and the "O.K." of the election. The sign on the inn kept the memory alive. Besides, the food at the inn was "oll korrect" as advertised. People began to say "O.K." when things were right.

QUESTIONS ON SELECTION NO. 1

0. What two letters are mentioned in the first line?
   1) A.B. 2) O.K. 3) X.Y. 4) P.S.
1. Why did Mr. Harrison come to Urbana?
   1) To see the "oll korrect" sign
   2) To get people to vote for him
   3) To visit some old friends
   4) To stay at the O.K. Inn
2. What is the purpose of paragraph 1?
   1) To tell where the expression "O.K." originated
   2) To get the reader interested in the article
   3) To tell that letters can be used for words
   4) To ask the reader if he knew what O.K. meant
3. Who first used the letters "O.K." for the words "Oll Korrect"?
   1) Wm. H. Harrison
   2) Daniel Leffller
   3) The innkeeper
   4) The article does not give his name
4. What is the topic of paragraph 2?
   1) The origin of the term "O.K."
   2) The election of Harrison
   3) The poor spelling of Ohio men
   4) The meaning of the term "O.K."
5. What is the author's purpose in paragraph 4?
   1) To show that the innkeeper's sign developed from the misspelled campaign banner
   2) To show that the innkeeper's sign helped make O.K. a popular expression
   3) To tell about the location and food of "The O.K. Inn"
   4) To tell who first used the term "O.K."
6. Why did the misspelled words on the banner make Harrison more popular?
   1) They made people believe Harrison was "oll korrect," as the banner said
   2) They suggested that Harrison was a common man
   3) The innkeeper of a popular inn put them on his sign
   4) Most people disliked good spellers
7. Why was Daniel Leffler mentioned?
   1) Because he helped Harrison win the election of 1840
   2) Because he carried a banner saying, "The people is oll korrect"
   3) Because he owned an inn that had very good food and service
   4) Because he helped to make O.K. a common expression
8. What is the author's purpose in writing this article?
   1) To make the reader curious by asking questions
   2) To show why it is sometimes good to misspell words
   3) To show how the English language has developed in the last 100 years
   4) To tell how one of our common expressions started
9. What kind of speller was Mr. Harrison?
   1) Good
   2) Average
   3) Poor
   4) The article does not give any clue
10. The expression "O.K." probably would have been forgotten if one of the following were true. Which one is it?
   1) If Daniel Leffler had been a better speller
   2) If the people had known who Daniel Leffler was
   3) If Mr. Harrison had been an unpopular candidate
   4) If Mr. Harrison's enemies had been good spellers

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*Reprinted by permission from "Iowa Every-Pupil Tests of Basic Skills," test A, form N, Advanced Battery, 1942.

These items and ones for problem solving and the higher mental processes do measure high-priority school goals—but growth in these areas is relatively slow, and most contractors will not risk basing reimbursement on the small chance that evidence of growth will be revealed by these criterion tests.

Using judgments of clinically experienced teachers to increase attention to the complexities of performance is considered too subjective (it is not) and too expensive (it is). For all these reasons we can expect some of the complex objectives of instruction to be underemphasized in the typical performance contract testing plan.

The success of Texarkana's first performance-contract year is still being debated. Late-winter (1969–70) test results looked good, but spring test results were disappointing.[4] Relatively simple performance items had been used. But the "debate" did not get into that. It started when the project's "outside evaluator" ruled that there had been direct coaching on most, if not all, of the criterion test items. The criterion test items were known by the contractor during the school year. Critics claimed an unethical "teaching for the test." The contractor claimed that both teaching and testing had been directed toward the same specific goals, as should be the case in a good performance contract. The issue is not only one of ethics, it deals with the very definition of education.

Teaching for the test.—Test specialists have recognized an important difference between preparation for a test and direct coaching for a test (Anastasi, 1954, p. 52). To prepare an examinee, the teacher teaches the designated knowledge-skill domain and has the examinee practice good test-taking behavior (e.g., don't spend too much time on overly difficult items; guess when you have an inkling though not full knowledge; organize your answer before writing an essay item) so that relevant knowledge skill is not obscured. Direct coaching is to teach the examinees how to make correct responses to the specific items on the criterion test.

This is an important difference when criterion test items represent only a small sample of the universe of items representing what has been taught or when the criterion test items are indirect indicators, i.e., correlates, rather than direct measurements, i.e., assessments (see Nunnally, 1959, p. 151).[5] It ceases to be an important difference when the criterion test is set up to measure directly and thoroughly that which has been taught. In this case, teaching for the test is exactly what is wanted.

The solution of the problem of teaching for the test probably lies in identifying for each objective a very large number (or all) of the items that indicate mastery or progress. Items from standarized tests, if used,[6] would be included as separate items, not as tests-as-a-whole. The item pool would need to be exhaustive in that, if a student could get a perfect score, there would be no important aspect of the objective that the student would not do well on. A separate random sample of items would be drawn for pretest and post-test for each child. Although attractive to a public concerned about the individual child, instructional success would be based on the mean gain of all students of a kind rather than on the gain of individual students. (The use of individual gain scores will be discussed in the next section.) Finding a sufficiently large pool of relevant, psychometrically sound test items is a major chore; but if it can be done, this procedure will prevent "teaching for the test" without introducing a criterion unacceptable to the contractor.

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[4] The official evaluation report was writtn by Andrew and Roberts (1970). Summaries and commentaries have been written by Dyer (1970), Schwartz 1970), and Welch (1970).

[5] The breech also represents the distances between an established teaching profession and challenging instructional technologists.

[6] Publisher's permission is needed.

Joselyn (1971) pointed out that the performance contractor and the school should agree in advance as to the criterion procedure though not necessarily to the specific items. To be fair to the contractor, the testing needs to be reasonably close to the teaching. To be fair to the school patrons, the testing needs to be representative of the domain of skills or abilities they are concerned about. A contract to develop reading skills would not be satisfied adequately by gains on a vocabulary test, according to the expectations of most people. All parties need to know how similar the testing is going to be to the actual teaching.

A dissimilarity scale.—Unfortunately, neither the test specialist nor anyone else has developed scales or grounds for describing the similarity between teaching and testing.[7] This is a most grievous failing. There is no good way to indicate how closely the tests match the instruction. Complete identity and uniqueness are recognizable by everyone, but important shades of difference are not even presently susceptible to good guessing.

Some idea of the importance of dissimilarity can be learned from the research literature on transfer of training.

> Working with nonsense syllables, Yum (1931) found that recall memory scores dropped substantially as the test-item stimulus symbol became different from the one learned. He taught persons to say "jury" when he presented the stimulus "toq-bex" and 13 other such stimulus-response combinations. One-third of the learners were retested a day later with the same stimuli; another third were retested with stimuli with one vowel changed; another third with both vowels changed. The results averaged for each subgroup were

1. Same stimuli on retest	50 percent "correct" recall
2. Single-letter change	33 percent "correct" recall
3. Double-letter change	11 percent "correct" recall

Generally speaking, as was expected, the greater the dissimilarity, the more difficult the question. In this work and elsewhere (Watts, 1970) another point has been made clear: Small variations can make large changes in item difficulty.

The problem is complicated by the fact that there are many ways for criterion questions to be made dissimilar. Here are some:

1. Syntactic transformation;
2. Semantic transformation;
3. Change in context or medium;
4. Application, considering the patricular instance;

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[7] Richard C. Anderson and his colleagues at the Training Research Laboratory, University of Illinois, have been working on the problem (Anderson, Goldberg, and Hidde, 1971; Wittrock and Hill, 1968).

5. Inference, generalizing from learned instances;
6. Implication, adding fast-taught information to generally known information.

For examples of some of these transformations, see Table III. Hively, Patterson, and Page (1968) and Bormuth (1970) have discussed procedures for using some of these transformations to generate test items.

TABLE III—*An example of Transformations of Information Taught into Test Questions*

Information taught:	Pt. Barrow is the northernmost town in Alaska.
Minimum transformation question:	What is the northernmost town in Alaska?
Semantic-syntactic transformation question:	What distinction does Pt. Barrow have among Alaskan villages?
Context-medium transformation question:	The dots on the adjacent map represent Alaskan cities and towns. One represents Pt. Barrow. Which one?
Implication question:	What would be unusual about summer sunsets in Pt. Barrow, Alaska

The difficulty of these items depends on previous and intervening learnings as well as the thoroughness of teaching. A considerable difference in difficulty and perceived relevance might be found between the least and most dissimilar questions.[8] It is apparent that performance contracting in the absence of good information about the similarity between test items and instructional objectives is scarcely an exercise in rationalism.

ANALYSIS OF GAIN SCORES

The following hazards are present in any instruction, not just in performance contracting. The testing specialist sees not one but at least four hazards attendant to the analysis and interpretation of learning scores. They involve (1) grade-equivalent scores, (2) the learning calendar, (3) the unreliability of gain scores, and (4) regression effects. All show how measures of achievement gain may be spurious. Ignoring any one of them is an invitation to gross misjudgment of the worth of the instruction.

Grade-equivalent scores.—Standardized achievement tests have the very appealing feature of yielding grade-equivalent scores. Teachers and parents like to use grade-equivalent scores. Raw scores, usually the number of items right, are transformed to scores indicating (for some national reference-group population of students) the grade placement of all students who got this raw score. These transformed scores are called grade equivalents. The raw scores are not very meaningful to people unacquainted with the particular test: the grade equivalents are widely accepted by teachers and parents. It is probably true that more of them should question the appropriateness of the distribution of scores made by the little-defined reference group as a yardstick for local assessment, but the grade equivalent does represent a piece of test information the public can readily put to use.[9] Grade equivalents are common terminology in performance contracts.

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[8] The reading items of any contemporary standardized achievement test—as illustrated in table II—are likely to be more dissimilar to reading teaching (performance contract or regular classroom) than any of the "dissimilarities" shown in table III.

Unfortunately, grade equivalents are only available from most publishers for tests, not for test items. Thus the whole test needs to be used, in the way prescribed in its manual, if the grade equivalents are to be meaningful, mean what they are supposed to mean. One problem of using whole tests was discussed in previous sections. Another problem is that the average annual growth for most standardized tests is a matter of only a few raw-score points. Consider in table IV the difference between a grade equivalent of 5.0 and 6.0 with four of the most popular test batteries.

TABLE IV.—GAIN IN ITEMS RIGHT NEEDED TO ADVANCE 1 GRADE EQUIVALENT ON 3 TYPICAL ACHIEVEMENT TESTS

	Grade equivalent		Items needed to improve 1 year G.E.
	5.0	6.0	
Comprehensive test of basic skills, level 3: Reading comprehension	20	23	3
Metropolitan achievement test, intermediate form B: Spelling	24	31	7
Iowa tests of basic skills, test A1: Arithmetic concepts	10	14	4
Stanford achievement test, form W, intermediate II: Word meaning	18	26	8

Most teachers do not like to have their year's work summarized by so little a change in performance. Schools writing performance contracts perhaps should be reluctant to sign contracts for which the distinction between success and failure is so small. But to do so requires the abandonment of grade equivalents, at least until a large pool of appropriate items can be identified as to their grade equivalence.[10]

Instructional specialists (Glaser, 1963; Hively, Patterson, and Page, 1968) have questioned the appropriateness of grade equivalents or any other norm referencing for interpreting items. They object to defining performance primarliy by indicating who else performs this well. Clearly the items on all standardized tests have been selected on the basis of their ability to discriminate between the more and less sophisticated students rather than as to whether or not they tell whether or not a person has mastered his task. Joselyn (1971) said that the items left may do the poorest job of describing performance. Jackson (1970) summarized the research and writing of those who endorse only those standardized test items which directly indicate successful attainment of the instructional objectives. But the items Jackson's authors would like educators to use usually do not exist—or if they do, there whereabouts are unknown. Creating and field-testing new test items is a difficult, time-consuming, costly task. For a local performance contract, the cost of developing their own criterion items could easily exceed the entire cost of instruction. In the years ahead, such criterion items must become available for purchase. Grade equivalents, as Lennon (1971) concluded, in spite of their apparent utility, are too gross for the measurement of individual short-term learning.

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[9] A shortage of understandable indicators is one reason the schools have not been accountable to the public. However, House (1971) claimed that it is unlikely that educators will us better report procedures even if available because there is much more risk than reward in doing so.

[10] Then we would ask, at what grade level do half the students get this item right? The score for a student would be the grade equivalents of the most difficult items he passes, with perhaps a correction for guessing.

The school calendar.—For most special instructional programs in the schools, criterion tests will be administered at the beginning of and immediately following instruction, often in the first and last weeks of school. There is a large amount of distraction in the schools those weeks, but choosing other times for pre- and post-testing has its hazards too. Getting progress every several weeks during the year is psychometrically preferred (Wick and Beggs, 1971); but most instructional people are opposed to all that testing.

Children learn year round, but the evidence of learning that gets inked on pupil-personnel records comes in irregular increments from season to season. Winter is the time of most rapid academic advancement, summer the least. Summer, in fact, is a period of sebtack for many youngsters. Beggs and Hieronymus (1968) found punctuation skills to spurt more than a year's worth between October and April but to drop almost half a year between May and September. Discussing their reading test, Gates and MacGinitie (1965) said:

> * * * in most cases, scores will be higher at the end of one grade than at the beginning of the next. That is, there is typically some loss of reading skill during the summer, especially in the lower grades.

The picture will be different, of course, depending on what the learners do in and out of school.[11]

The first month or two of the fall, when students first return to school, is the time for getting things organized and restoring general skill abilities lost during the summer. According to some records, spring instruction competes with only partial success with other spring attractions. Thus, the learning year is a lopsided year, a basis sometimes for miscalculations. Consider the results of testing shown in table V.

TABLE V.—LEARNING CALENDAR FOR A TYPICAL 5TH-GRADE CLASS

	Month					
	September-October	November	December-January	February	March-April	May
Mean achievement score	5.0	5.3	5.6	5.9	6.2	6.3

The every 2 months' averages in table V are fictitious, but they represent test performance in a typical classroom. The growth for the year appears to be 1.3. No acknowledgment is made there that early September standardized test results were poorer than those for the previous spring. For this example the previous May mean (not shown) was 5.2. The real gain, then, for the year is 1.1 grade equivalents rather than the apparent 1.3. It would be inappropriate to pay the contractor for a mean gain of 1.3.

Another possible overpayment on the contract can result by holding final testing early and extrapolating the previous per-week growth to the weeks or months that follow. In Texarkana, as in most schools, spring progress was not as good as winter. If an accurate evaluation of contract instructional services is to be made, repeated testing, perhaps a month-by-month record[12] of learning performances needs to be considered.

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[11] A spring slowdown and summer setback sometimes occur in conventional school programs. If the instructional program began in March or in June, the results would not necessarily be the same.

[12] Wrightman and Gorth (1969) described Project CAM as a model for a continuous (perhaps every two weeks) performance monitoring record.

Perhaps the biggest when-to-test problem arises from the common belief that schooling is not supposed to aim at terminal performance (at project's end) but to aim at continuing performance in the weeks and months and years that follow. Many diverse instructional specialists (Gagné, Mayor, Garstens, and Paradise, 1962; Traub, 1966; Atkin, 1963) agree that the instructor should use different tactics to maximize long-term rather than short-term gain. Teachers are inclined to emphasize long-term aims; the performance contractor has proposed to deal with short-term aims. They will disagree about the allocation of teaching time. The contractor points out that he is there because the school recognized that some students need immediate remedial work. He, the contractor, is not going to dilute his remedy just because there are many other important objectives for the school. He is not going to give major attention to how this instruction will coordinate with what the student will get in simultaneous and subsequent instruction. His is a defensible position. Whether or not he should be placed in a position that will substantially reduce emphasis on a long-range educational goals is an issue needing attention early in any discussions about performance contracting.

Unreliable Gain Scores. Most performance contracts pay off on an individual-student basis. The contractor may be paid for each student who gains more than an otherwise expected amount. This practice is commendable in that it emphasizes the importance of each individual learner and makes the contract easier to understand, but it bases payment on a precarious landmark: the gain score.

Let us see how unreliable the performance-test gain score is. For a typical standardized achievement test with two parallel forms, A and B, we might find the following characteristics reported in the test's technical manual:

Reliability of Test A = +.84.
Reliability of Test B = +.84.
Correlation of Test A with Test B = +.81.

Almost all standardized tests have reliability coefficients at this level. By using the standard formula (Thorndike and Hagen, 1969, p. 197), we find a disappointing level of reliability for the measurement of improvement.

Reliability of Gain Scores (A—B or B—A) = +.16.

The manual would indicate the raw score and grade-equivalent standard deviations. For one widely used test they are 9.5 items and 2.7 years, respectively. Using these values we can calculate the errors to be expected. On the average, a student's—

Raw score would be in error by 2.5 times.
Grade equivalent would be in error by 0.72 years.
Grade-equivalent "gain score" would be in error by 1.01 years.

The error is indeed large.

Consider that this means for the not-unusual contract whereby the student is graduated from the program, and the contractor is paid for his instruction, on any occasion that his performance score rises above a set value. Suppose—with the figures above—the student exits whenever his improvement is 1 year grade equivalent or better. Suppose also, just to make this situation simpler, that there is no intervening training and that the student is not influenced by previous testing. Here are three ways of looking at the same situation:

> Suppose that a contract student were to take a different parallel form of the criterion test on three successive days immediately following the pretest. The chances are better than 50:50 that on one of these tests the student would have gained a year or more in performance and would appear to be ready to graduate from the program.
>
> Suppose that three students were to be tested with a parallel form immediately after the pretest. The chances are better than 50:50 that one of the three students—entirely due to the errors of measurement—would have gained a year or more and appear ready to graduate from the program.
>
> Suppose that 100 students were admitted to contract instruction and pretested. After a period of time involving no training, they were tested again and the students gaining a year were graduated. After another period of time, another test and another graduation. After the fourth terminal testing, even though no instruction had occurred, the chances are better than 50:50 that two-thirds of the students would have been graduated.

In other words, the unreliability of gain scores can give the appearance of learning that actually does not occur.

The unreliability also will give an equal number of false impressions of deteriorating performance. These errors (false gains and false losses) will balance out for a large group of students. If penalties for losses are paid by the contractor at the same rate bonuses are paid for gains, the contractor will not be overpaid. But according to the way contracts are being written, typified in the examples above, the error in gain scores does not balance out: it works in favor of the contractor. Measurement errors could be capitalized upon by unscrupulous promoters. Appropriate checks against these errors are built into the better contracts.

Errors in individual gain scores can be reduced by using longer tests. A better way to indicate true gain is to calculate the discrepancy between actual and expected final performances.[13] Expectations can be based on the group as a whole or on an outside control group. Another way is to write the contract on the basis of mean scores for the group of students.[14] Corrections for the unreliability of gain scores are possible, but they are not likely to be considered if the educators and contractors are statistically naive.

Regression Effects.—Buried back here in this paper is probably the source of the greatest misinterpretation of the effects of remedial instruction. Regression effects are easily overlooked but need not be; they also are susceptible to correction. For any pretest score the expected regression effect can be calculated. Regression effects make the poorest scorers look better the next time tested. Whether measurements are error-laden or error-free, meaningful or meaningless, when there is differential change between one measurement occasion and another (i.e., when there is less-than-perfect correlation), the lowest original scorers will make the greatest gains and the highest original scorers will make the least. On the average, post-test scores will, relative to their corresponding pretest scores, lie in the direction of the mean. This is the regression effect. Lord (1963) discussed this universal phenomenon and various ways to set up a proper correction for it.

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[13] Tucker, Damarin, and Messick (1965) have discussed change scores that are independent of and dependent on the initial standing of the learner. A learning curve fitted to test scores could be used to counter the unreliability of individual scores.

[14] This would have the increased advantage of discouraging the contractor from giving preferential treatment within the project to students who are in a position to make high pay-off gains.

The demand for performance contracts has occurred where conventional instructional programs fail to develop—for a sizable number of students—minimum competence in basic skills. Given a distribution of skill test scores, the lowest-scoring students, ones most needing assistance, are identified. It is reasonable to suppose that under unchanged instructional programs they would drop even further behind the high-scoring students. If a retest is given, however, after any period (of conventional instruction, of special instruction, or of no instruction), these students will no longer be the poorest performers. Some of them will be replaced by others who then appear to be most in need of special instruction. Instruction is not the obvious influence here—regression is. Regression effect is not due to test unreliability—but it causes some of the same misinterpretations. The contract should read that instruction will be reimbursed when gain exceeds that attributable to regression effects. The preferred evaluation design would call for control group(s) [15] of similar students to provide a good estimate of the progress the contract students would have made in the absence of the special instruction.

THE SOCIAL PROCESS

The hazards of specific performance testing and performance contracting are more than curricular and psychometric. Social and humanistic challenges should be raised too. The teacher has a special opportunity and obligation to observe the influence of testing on social behavior.

At several places in the preceding pages I have referred to the uniqueness of making major personal and scholastic decisions on the sole basis of student performances. This is unique also because it puts the student in a position of administrative influence. Here he can influence what the instructional benefit would look like. He can make it look better or poorer than it really is (Anastasi, 1954, p. 56). More responsibility for school control possibly should accrue to students, but performance contracts seem a devious way to give it.

Even if he is quite young, the student is going to be aware that his good work will bring rewards to the contractor. Sooner or later he is going to know that, if he tests poorly at the beginning, he is able to do more for himself and the contractor. Bad performances are in his repertoire—he may be more anxious to make the contractor look bad than to make himself look good. He may be under undue pressure to do well on the post-tests. These are pupil-teacher interactions that should be watched carefully.

To motivate the student to learn and to make him want more contract instruction, many contractors use material or opportunity-to-play rewards. (Dorsett used such merchandise as transistor radios.) Other behavior modification strategies (Meecham and Wiesen, 1969) are common. The proponents of such strategies argue that, once behavior has been oriented to appropriate tasks, the students can gradually be shifted from extrinsic rewards to intrinsic. That they can be shifted is probably true, that that it will happen without careful deliberate work by the instructional staff is unlikely. It is not difficult to imagine a performance-contract situation in which the students become even less responsive to the rewards of conventional instruction than they were before.

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[15] Wardrop (1971) has discussed the problem of control groups that do not provide an appropriate control.

Still another hazard of performance contracting and many other uses of objectives and test items is that by using them as we do, without acknowledging how much they indirectly and incompletely represent educational goals, we misrepresent education. People inside school and out pay attention to grades and tests and monetary reimbasements. We may not value factual knowledges and simple skills proportionately to the attention they get, but we have ineffective ways of indicating what our priorities really are (Stake, 1970).

It is difficult for many people to accept the fact that in conventional classrooms a vast number of educational goals are simultaneously pursued (Gooler, 1971). Efforts to get teachers to specify those objectives result in a simplified and incomplete list. The performance contractor has an even shorter list. Even if performance contracting succeeds in doing the relatively small job it aims to do, adequate arguments have not been made that this job should be given the priority and resources that the contractors require.

In early 1971 performance contracting appears to be popular in Washington with the current administration because it encourages the private business sector to participate in a traditionally public responsibility. It is popular among some school administrators because it gets some tough-to-get Federal funds, because it is a novel and possibly cheaper way to get new talent working on old problems, and because the administrator can easily blame the outside agency and the Government if the contract instruction is unsuccessful. It is unpopular with the American Federation of Teachers because it reduces the control the union has over school operations and it reduces the teacher's role as a chooser of what learnings students are most in need of. It is popular among most instructional technologists because it is based on a number of well researched principles of teaching and because it enhances their role in school operations.

The accountability movement as a whole is likely to be a success or failure on such sociopolitical items as in the foregoing oversimplified list. Cohen (1970) reminded evaluators to look for the issues the decisionmakers are concerned about. All too seldom do these include the measures of performance considered in this paper. The measurement of the performance of performance contracting is an even more hazardous procedure than the measurement of student performances.

Summary.—Without yielding to the temptation to harass new efforts to provide instruction, educators should continue to be apprehensive about evaluating teaching on the basis of performance testing alone. They should know how difficult it is to represent educational goals with statements of objectives. They should know how costly it is to provide suitable criterion testing. They should know that the common-sense interpretation of these results is frequently wrong but that many members of the public and the profession think that special designs and controls are extravagant and mystical.

Performance contracting emerged because people inside the schools and out were dissatisfied with the instruction some children are getting. Implicit in the contracts is the expectation that available tests can measure the newly promised learning. The standardized test alone cannot measure the specific outcomes of an individual student with sufficient precision. This limitation and other hazards of performance measurement are applicable, of course, to the measurement of specific achievement in regular school programs.

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ALTERNATIVE FUTURES FOR LEARNING: AN ANNOTATED BIBLIOGRAPHY OF TRENDS, FORECASTS AND PROPOSALS

BY MICHAEL D. MARIEN

FOREWORD

This incomplete bibliography is an attempt to sketch out the range of literature that is relevant to educational policymaking. In the broadest sense, nearly all literature on education could be considered as policy-relevant, but for present purposes this bibliography has been confined to trends, forecasts, and proposals or documents on changes that are taking place, future states of affairs that may occur, or recommended states of affairs that ought to occur.

The original impetus behind this effort was to document the futures literature and to discover how writers have thought and are thinking about the future. However, especially for education, a broad concept of futures literature is essential, because many documents use the rhetoric of futures in their titling (The Future of . . . ; . . . in the Seventies; . . . for the Future; . . . in the Year 2000) with little or no substance in the text; other documents seriously deal with possible futures without any such suggestion in their titles. Thus, to rediscover an old truth, one cannot tell a book from its cover. Furthermore, especially in recent years, there is strong motivation to make recommendations for immediate action: and whether or not the language of futures is invoked, any such proposal for reform is an alternative future.

An ideal of critical annotation has been pursued here with, if well done, is seen as enhancing the value of an item by several times over that of a mere listing. Unfortunately, the ideal has been reached for less than half of the citations, with many of the annotations being noncritical and superficial. Publishers' advertisements have been used in a number of cases, with the rationale that some information, even if hyperbolic, is better than none at all.

Nevertheless, a multi-purpose information system is suggested here to be applied to the many purposes of the wide variety of participants who shape educational policy. A forum is also provided for any notion whatsoever—establishment or antiestablishment, technocrat or humanist, radical or conservative—about who should learn what and how. Where feasible, the annotations attempt to relay the most pungent comments and salient conclusions of each author, in his own words if possible. Although considerable work remains to be done, this format also suggests an idea bank, by listing key concepts in the index by selected subject.

To cope somewhat with information overload, about one-fifth of the items cited here have been recommended. Despite compiler bias, it is felt to be necessary that some attempt be made to separate wheat from chaff. Such an effort should not be taken too seriously, for all of the items have not been judged equally. In nearly every case where a recommendation has been made, the document has been at least looked at, if not read thoroughly. Thus, there are many documents listed here that, if actually looked at, could warrant some kind words. Conversely, there are also many documents that might warrant unkind words. Even if all documents were considered thoroughly at the same moment of time, the distinction between valuable and not-so-valuable is often difficult to make.

From those who are new to the consideration of alternative futures for learning, and therefore at a loss as to where to start, it is strongly recommended that several general books be read first, such as Michael (1), Toffler (2), Ferkiss (9), Mead (71), Coombs (109), and Bakdikan (645). An understanding of the changing societal context lends a far greater appreciation to the variety of alternative futures for learning that is listed here.

A. COVERAGE

As indicated at the outset, this bibliography is still incomplete. Aside from the missing or superficial annotations (by the standards employed here), an estimate is warranted of the relevant literature that is not cited at all. General futures literature, or the Social Foregrounds of Education is certainly of importance to considering what should be learned. Ideally, education should be for the society in which we live, and, recognizing that our future society will be different from the present, not to mention the past, education should be aimed toward some future state of affairs, no matter how ill-defined. All futures literature is therefore relevant to education, but because of its immense variety, general literature has been limited here to that which makes some explicit mention of education and/or learning (items 1–109). An additional bibliography (806) will attempt a survey of more general futures literatures. Both bibliographies generally exclude science fiction, utopian literature, and contemporary novels set in some future time.

Even the literature on educational futures is far from complete. The major focus is on books and book-length documents (arbitrarily defined as more than 50 pages in length); together comprising 761 of the 936 items cited here, or more than 80 percent of the total. The coverage of books published by trade and university presses is estimated as fairly complete. However, the gray literature—congressional documents, and reports from research institutes, Government agencies and the multitude of interest groups impacting no education—is far from complete, and no estimate of the extant literature could be made. At least an attempt has been made to recognize this literature, some of which is at the forefront of contemporary thinking.

Journal and magazine articles have been included, but there has been no attempt to systematically comb all of the periodical literature, and such an attempt could easily double the length of this bibliogarphy. Many articles are trivial, superficial, or spin-offs from books; to pursue all such literature may be counterproductive. Rather, articles are cited that present ideas and proposals not to be found in books. At a very rough estimate, perhaps 10–30 percent of all important articles have been covered.

Coverage of documents published outside of the United States is very skimpy, and the few foreign documents cited are largely from England and Canada. However, as pointed out by Coombs (109), there are many common educational problems in our emerging global society, and Alternative Futures for Learning should ideally reflect viewpoints from around the world. This bibliography will hopefully stimulate similar attempts at documentation in other countries, eventually leading to a global integration where the best proposals from all nations are made readily available to all who are concerned with the future of learning. As a start in this direction, Hugh Stevenson, at the University of Western Ontario at London, is setting up an educational futures bibliography for Canada.

B. CATEGORIZATION

The citations are not arranged alphabetically, for such an arrangement is mechanical; the location of authors herein is made possible by the author index. Rather, there has been an attempt at heuristic juxtaposition, arranging items so that there is some logical flow or clashing contrast—so that a cluster of perhaps a dozen documents can be compared together. Although this has been attempted, there are many cases where there is little or no relationship, and the user is therefore cautioned against reading too much meaning into the arrangements. In several instances, no basis for arrangement has been discovered, and a more or less alphabetized sequence has been resorted to (e.g., items 162–248). Overall, there are many implicit subcategories, which are left as such in order to avoid a profusion of labeling.

In general, the arrangement leads from the broad to the narrow. All users should have an interest in part I, which lists general education-related documents and multinational and/or multilevel overviews of education. And all users should check the 123 items in the addenda, which are arranged parallel to parts I–VI.

C. SOME OBSERVATIONS ON THE LITERATURE

With the limitations described above, some tentative generalizations can be made as to the quantity and quality of the literature, the major themes and major omissions, and the relationship of educational futures literature to other futures literature.

1. *Growing quantity.*—Undoubtedly, there is a widespread intuitive sense that the literature on alternative futures for learning is growing rapidly. As one reviewer recently noted in covering four new books at once: The business of producing such books is threatening to become the very assembly line that students as well as the authors of such books are rebelling against. Indeed, to the degree that appropriate universe has been roughly represented, the ball park data lends confirmation to these suspicions. Between 1966 and 1968, the quantity nearly doubled, and it more than doubled between 1968 and 1970.

The growth in the literature on educational futures and reform is especially notable for higher education. Aside from the growth of higher education and the pervasive problems of finance and governance—obvious reasons for generating literature—special note should be made of two major projects. The Carnegie Commission on Higher Education (370) has sponsored a considerable publications list in the past 2 years, with far more in the offing. Across the bay in San Francisco, Jossey-Bass Publishers has been rapidly adding new titles to its generally excellent series in higher education.

TABLE 1.—DOCUMENTS CITED BY DATE OF PUBLICATION

	1971	1970	1969	1968	1967	1966	1960–65	1950–59	pre-1950	Total
U.S. books and book-length documents:										
On education	78	120	93	60	30	34	54	15	16	500
Education-related	20	72	49	30	14	13	22	4	4	228
Foreign books	1	8	6	4	7	5	2			33
Articles	15	27	26	10	11	4	3	1	2	99
Article-length reports (under 50 pages)	7	24	9	9	8	3	4		1	65
New periodicals		3	2	4	1	1				11
Total	121	254	185	117	71	60	85	20	23	936
Percent of total	12.9	27.1	19.8	12.5	7.6	6.4	9.1	2.1	2.5	100

Exponential increases in the literature of educational reform cannot be expected to continue indefinitely; indeed the increase could level off or even decline at any time, as a result of widespread reforms actually taking place or as a result of reformer despair. Neither event appears too likely, however, and the prospect of heavy R. & D. funding through the proposed National Institute of Education could generate far more policy-relevant literature than at present.

2. *Shifts in time and purpose.*—Men have always attempted to forecast the future in some manner, but the quantity of future-casting has been considerably stepped up in recent years as it is increasingly recognized that our society is undergoing a profound transition. Whether or not one identifies himself as a futuristic, we nevertheless live in an age of extending horizons where a great number of writers have extended their time focus so that one or more possible future states of society are considered to some degree. Judging from the general lack of cross-citation, it appears that most writers have shifted from a present- to a future-orientation independent of each other; that the transition results from social influences rather than intellectual influences. It is therefore incorrect to claim that the futurist movement has stimulated others to think about the future, although it may have done so indirectly. Rather, the emergence of professional futurists is merely a salient indicator of the general trend in thinking; a centerpiece, rather than a keystone.

This shift in time frame is even more apparent when one considers the trend from the rhetorical use of the future to a genuine sense of the future. Much of the literature cited in the section on Pre-1960 Forecasts (items 766–793) employs the future in its titling, without any sense of trends or possible futures. Perhaps the most outrageously misleading title is "Education 2000 A.D.," resulting from a 1956 symposium (206). The titles from symposia still tend to be inflated, for example, "Educating for the Twenty-first Century" (393), but individual authors increasingly tend to meet promise with performance. "The Future of Public Education" (276), published in 1960, proves to be an analysis of power relationships with an advocacy of more teacher power; today, such a title would be expected to deal with broad social trends and the year 2000.

Another trend can be detected: From description to prescription, or from passively analyzing a problem or even an area of inquiry not seen as a problem, to actively proposing remedies or reforms. Although the classification of literature by major intent is extremely subjective, the rough estimate provided below may nevertheless be of some value.

TABLE 2.—MAJOR INTENT OF 500 BOOKS AND BOOK-LENGTH REPORTS ON EDUCATION

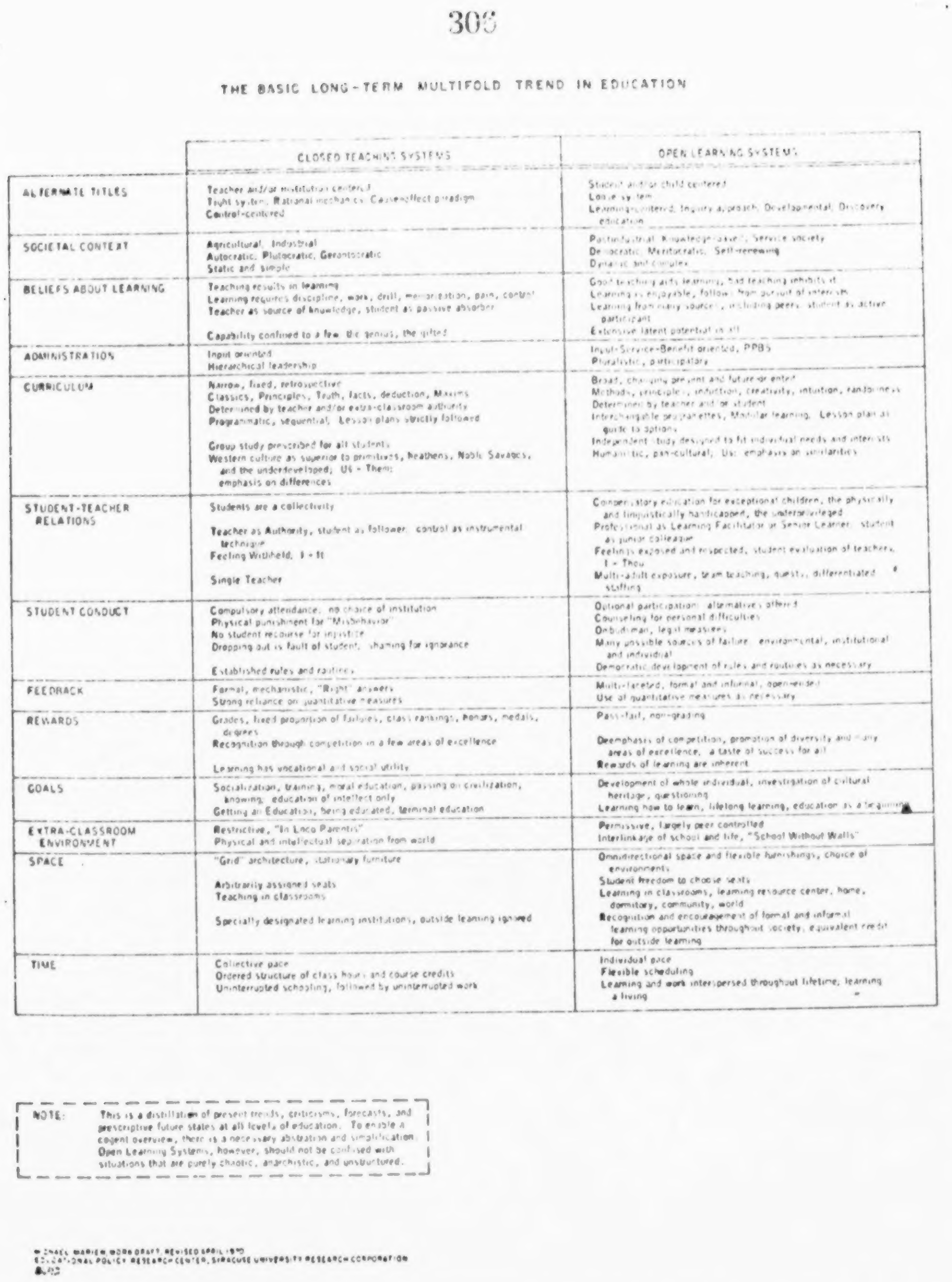
	1971	1970	1969	1968	1967	1966	1960–1965	1950–1959	Pre-1950	Total
Mainly prescriptive:										
General	2	6	7	1		1	3		2	22
E. & S.	21	35	23	22	11	6	22	8	6	154
Higher education	24	29	31	10	3	9	8	2	2	18
Adult education, etc	2	4	4	1			2			13
Subtotal	49	74	65	34	14	16	35	10	10	307
Mainly nonprescriptive: [1]										
General	3	3	3		3	1	2	1	1	17
E. & S.	5	3	7	12	8	9	7	1	2	54
Higher education	8	11	10	9	5	7	8	3	3	64
Adult education, etc	1	2	2	2		1	1			9
Subtotal	17	19	22	23	16	18	18	5	6	144
On governance:										
E. & S.	1	9	2	1			1			14
Higher education	11	18	4	2						35
Total	78	120	93	60	30	34	54	15	16	500
Percent of total	15.6	24.0	18.6	12.0	6.0	6.8	10.8	3.0	3.2	100.0

[1] Trends, descriptive forecasts, and analyses.

As an example of this shift, Ronald Gross and Judith Murphy edited The Revolution in the Schools in 1964 (195), falsely proclaiming changes that had occurred or appeared to be occurring. In 1969, Ronald and Beatrice Gross edited Radical School Reform (196), suggesting thorough-going changes that ought to occur, in line with many others who have found that small and isolated band-aid changes are inadequate, even if they are effected.

3. *The major theme: From closed teaching systems to open learning systems.*—To broadly summarize the literature, there is a basic, long-term multifold trend from closed teaching systems to open learning systems. The chart on the following page summarizes the many elements of this trend by distilling empirical trend analysis, criticisms, forecasts, and proposed future states for all levels of education. There are many ways in which this basic trend is promulgated. At lower levels, informal education is presently the fashionable title, as popularized by Silberman's "Crisis in the Classroom" (243). At higher levels, education for human development is the key term. Overall, there is a fundamental transition from considering teaching and other inputs into the educative process to the consideration of learning outcomes. Thus the title of this bibliography, in line with the shift in attention from institutions to individuals, emphasizes Alternative Futures for Learning, rather than Alternative Futures for Education. Whether or not educating institutions are involved, the new concern is focused on learning wherever it occurs. This spirit is notably embodied by the recently established Commission on Non-Traditional Study (923).

In one respect, only one alternative to the present is suggested by the literature. But there are many variations to this single basic theme, reflecting the complex pluralism that will surely characterize our future education that seeks to satisfy multiple needs and multiple ideologies. Moreover, the traditional closed teaching systems remain as a most probable future for many Americans, whether desired or not. Yet, in all of the documents cited here, there is not a single one that defends the present system. Stated conversely, everyone advocates some degree of change and nearly all of the advocacy is for open systems. Yet the additional practices persist, as discovered by the all-too-few examples of somber empiricism such as Goodlad (188), Oettinger (321), Dressel and Delisle (472), and Ladd (750). The humanistic revolution that has been described, forecasted, and advocated, has yet to take place. But will it?



THE BASIC LONG-TERM MULTIFOLD TREND IN EDUCATION

	CLOSED TEACHING SYSTEMS	OPEN LEARNING SYSTEMS
ALTERNATE TITLES	Teacher and/or institution centered Tight system; Rational mechanics; Cause-effect paradigm Control-centered	Student and/or child centered Loose system Learning-centered; Inquiry approach; Developmental; Discovery education
SOCIETAL CONTEXT	Agricultural; Industrial Autocratic; Plutocratic; Gerontocratic Static and simple	Post-industrial; Knowledge-based; Service society Democratic; Meritocratic; Self-renewing Dynamic and complex
BELIEFS ABOUT LEARNING	Teaching results in learning Learning requires discipline, work, drill, memorization, pain, control Teacher as source of knowledge, student as passive absorber Capability confined to a few: the genius, the gifted	Good teaching aids learning; bad teaching inhibits it Learning is enjoyable, follows from pursuit of interests Learning from many sources, including peers; student as active participant Extensive latent potential in all
ADMINISTRATION	Input oriented Hierarchical leadership	Input-Service-Benefit oriented, PPBS Pluralistic, participatory
CURRICULUM	Narrow, fixed, retrospective Classics, Principles, Truth, facts, deduction, Maxims Determined by teacher and/or extra-classroom authority Programmatic, sequential; Lesson plans strictly followed Group study prescribed for all students Western culture as superior to primitives, heathens, Noble Savages, and the underdeveloped; Us - Them: emphasis on differences	Broad, changing present and future-oriented Methods, principles, induction, creativity, intuition, randomness Determined by teacher and/or student Interchangeable programettes, Modular learning; Lesson plan as guide to options Independent study designed to fit individual needs and interests Humanistic, pan-cultural; Us: emphasis on similarities
STUDENT-TEACHER RELATIONS	Students are a collectivity Teacher as Authority, student as follower; control as instrumental technique Feeling Withheld; I - It Single Teacher	Compensatory education for exceptional children, the physically and linguistically handicapped, the underprivileged Professional as Learning Facilitator or Senior Learner; student as junior colleague Feelings exposed and respected; student evaluation of teachers; I - Thou Multi-adult exposure, team teaching, quests, differentiated staffing
STUDENT CONDUCT	Compulsory attendance; no choice of institution Physical punishment for "Misbehavior" No student recourse for injustice Dropping out is fault of student; shaming for ignorance Established rules and routines	Optional participation; alternatives offered Counseling for personal difficulties Ombudsman, legal measures Many possible sources of failure: environmental, institutional and individual Democratic development of rules and routines as necessary
FEEDBACK	Formal, mechanistic, "Right" answers Strong reliance on quantitative measures	Multi-faceted, formal and informal, open-ended Use of quantitative measures as necessary
REWARDS	Grades, fixed proportion of failures, class rankings, honors, medals, degrees Recognition through competition in a few areas of excellence Learning has vocational and social utility	Pass-fail, non-grading Deemphasis of competition, promotion of diversity and many areas of excellence; a taste of success for all Rewards of learning are inherent
GOALS	Socialization, training, moral education, passing on civilization, knowing; education of intellect only Getting an Education, being educated, terminal education	Development of whole individual, investigation of cultural heritage, questioning Learning how to learn, lifelong learning, education as a beginning
EXTRA-CLASSROOM ENVIRONMENT	Restrictive, "In Loco Parentis" Physical and intellectual separation from world	Permissive, largely peer controlled Interlinkage of school and life, "School Without Walls"
SPACE	"Grid" architecture, stationary furniture Arbitrarily assigned seats Teaching in classrooms Specially designated learning institutions, outside learning ignored	Omnidirectional space and flexible furnishings, choice of environments Student freedom to choose seats Learning in classrooms, learning resource center, home, dormitory, community, world Recognition and encouragement of formal and informal learning opportunities throughout society, equivalent credit for outside learning
TIME	Collective pace Ordered structure of class hours and course credits Uninterrupted schooling, followed by uninterrupted work	Individual pace Flexible scheduling Learning and work interspersed throughout lifetime; learning a living

NOTE: This is a distillation of present trends, criticisms, forecasts, and prescriptive future states at all levels of education. To enable a cogent overview, there is a necessary abstraction and simplification. Open Learning Systems, however, should not be confused with situations that are purely chaotic, anarchistic, and unstructured.

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An optimistic forecaster would look at the unprecedented outpouring of reformist literature, and argue that it will only require a few years for the literature to flow outwards to legislators and other officials and to teachers, parents, and students. Unlike the false or premature proclamations earlier in this century by a small group of progressives (items 767–770), the optimist would interpret the widespread literature of reform issuing from a wide variety of individual writers, invisible colleges, commissions and interest groups as a harbinger of a real revolution in education and learning.

But the pessimist would reply that, despite this swollen body of literature, the traditional system will still persist. It could be argued that there is a considerable duplication in the literature, with its advocacy of community control, student participation, abandoning grades, more relevant studies, and less bureaucracy—and, as elsewhere, the literature of reform is read by those who are already convinced. Moreover, in order to promote their professional status, academics generally address their message to other academics. Only three books in this bibliography are written by teachers and specifically addressed to students (items **440**, **522**, and **869**). Only one book, by a parent, is explicitly for parents (275). The pessimist would argue that the literature of alternative futures for learning aptly demonstrates the impotence of liberal intellectuals to communicate with those who hold traditional values. Many books are promoted by their publishers as arousing a storm of controversy, whereas a more realistic assessment might only find a ripple of interest in a few localities.

Nevertheless, even the pessimist—unless totally overcome by ideological beliefs that the system never changes—can find evidence that some change has occurred in the direction of open learning systems. The problem, as elsewhere, is that rising needs and expectations are rapidly outdistancing actual changes.

4. *The Major omission: Adult education.*—There is a major omission in this body of literature concerned with alternative futures for learning. Whereas, there are 222 books devoted to elementary and secondary education, and 217 books devoted to higher education (table 2), and several hundred others than are related in some way to these age-graded institutions, there are only 22 documents that are primarily focused on adult and continuing education. Of these, virtually all have been published by low-visibility institutes and centers. In recent years, not a single book primarily devoted to adult learning has been published and widely promoted by a major trade publisher.

There are several obvious explanations for this neglect. First, education has traditionally been considered as an activity involving only the young, and the young and their learning needs are obviously still with us. Second, the institutional context that supports literature on education and educational futures is explicitly dedicated to servicing either elementary/secondary or higher education. The two levels are almost completely segregated intellectually. Of the few volumes taking a multilevel perspective (items 129–161) several are probably miscategorized because the real content is not known.

Third, adult education has traditionally been a low-status subject of inquiry, especially because it has been traditionally associated with vocational education. Fourth, adult education is generally a voluntary self-financing activity, or it is privately sponsored. It is not of direct public concern that a corporation cannot afford to continue its training school, or that individuals cannot find funds to attend proprietary schools. Moreover, there are no viable student revolts in the classrooms of the military or the great books discussion groups—formally organized learning activities that get little attention in any event. Finally, the realm of adult or peripheral education is so diverse and fragmented that it is difficult to conceptualize, adding to the fact that there is very little data to support any conceptualization.

Yet, according to Moses (598), the periphery of corporate and military schools, proprietary schools, correspondence schools, antipoverty programs, television courses, and other adult activities of churches, unions, colleges, clubs, etc., has been growing at a faster rate than core education, and on a head count basis, there are probably more adults enrolled in the periphery than in the core. By 1976, Moses estimates that enrollment in the periphery may be 55 percent of the total learning force, comprising all individuals participating in formally organized learning activities.

The data alone suggest that far more attention should be given in the literature to adult learning. The hopeful reformers of K–12 and higher education consistently reiterate that our emerging knowledge-based and dynamic society demands a lifetime of learning, and that children should be taught how to learn rather than gorged with facts that may be obsolete or irrelevant. But this is a long-range investment, and if we are survive as a society over the next few decades, more attention must be paid to the agenices that facilitate adult learning.

And there is a far more important justification for considering alternative futures for adult learning. It is a fundamental but neglected fact that schools reflect their surrounding communities and cannot be expected to rise too far above them by any standard of intellect or human development. To bring about a desirable future for schools and colleges requires adult education. Parents, teachers, administrators, professors, legislators, and voters must all acquire new skills, concepts, and values to reflect new social and technological realities. The failure of the vast reform literature cited here, if indeed it does fail, will be a failure of adult education—a failure of hundreds of putative teachers to convincingly communicate their vision of what education can and ought to be, as a result of what is happening to our future-shocked world.

In addition to problems of communication, there are problems of adult capacity. Education is traditionally seen as an activity where the old pass on their wisdom to the young. But in a rapidly changing society, many of the skills, concepts, and values of the old are outdated. As Margaret Mead (71) has been saying for a number of years, we are all like immigrants. While retain the mechanisms for socializing the young, we do not have mechanisms for socializing the old. Furthermore, the old are not expected to learn. We still retain the traditional concept of getting an education through attending school, after which it is presumed that one is sufficiently educated. We encourage the young to learn (in terms established by the old), we test the young extensively for their knowledge, and we worry that their education is not adequate. There is no corresponding worry for postschool populations. One man's opinion is as good as another man's, just as one man's vote equals another's. Differences are attributed to values and beliefs, rather than knowledge. What individuals actually know—relative to what a reasonably informed worker, citizen, and parent should know—is seldom a subject of inquiry for social scientists, and educators are only concerned with what the young should know. "The National Assessment of Educational Progress" (936), although an important beginning, does not yet measure the knowledge of adults over 35.

Many adults continue to learn—perhaps far more than we recognize, according to the studies conducted by Tough (599). It will be increasingly important to find ways to help adults learn, not only to appreciate the necessity for changing the education of the young to fit contemporary and forecasted needs, but also to enable the old to keep up with the young. The adult dropout problem, as described by Gardner (20), may be a far more serious problem than that of the young high school dropout.

5. *Educational futures literature and general futures literature.*—A final observation is offered regarding the relationship of educational futures literature to all other futures literature. In the broadest sense, all futures literature is relevant to education, not only because it is educational but also because the descriptions and prescriptions for future population levels, environments, the polity, the economy, and the family, suggest the society that we are educating for at present, and in which education will be taking place in the future. Needless to say, virtually every writer on the future envisions a state of affairs different from the present, reinforcing the widespread view that much of what is learned today will not be relevant in the future. Futures studies will, of necessity, become an important part of any curriculum (items 516, 517, 777), although the spread of such transdisciplinary inquiry is seriously inhibited by the traditional organization of knowledge.

As a very rough approximation, the literature of educational futures (as broadly defined here) appears to comprise about one-third of all futures literature. Under a more stringent defintion, confined to forecasts and proposals for reform based on the consideration of some future state of society, educational futures literature would of course comprise a much smaller proportion of the total.

There are several reasons for the great attention paid to education. First, education is the most dominant activity in our society, costing even more than than the military when expenditures for all educating institutions are considered. Second, the points of decisionmaking are highly diffused, with elected and appointed officials, administrators, teachers, parents, students, suppliers, and a wide variety of interest groups all serving to influence the formation of different policies to varying degrees. Thus, there are many messages aimed at many audiences, as opposed to transportation policy or foreign policy which are formulated by a relatively small number of persons. Third, education is a soft activity, controversial, difficult to define and measure, and quite variegated when broadly defined, for learning is a necessary input to every social activity.

Finally, everyone has had extensive experience with formal education and there are consequently many experts. Whereas we defer to authority in fields of health, religion, and technology, many individuals hold strong beliefs about education, whether or not well-founded. Especially in higher education, every faculty member considers himself knowledgeable in education, as well as his academic specialty. Thus when crisis hits the campus, creating an uncertain future which is ripe for invention, there are many potential experts to provide solutions. In addition to individual views, policy-relevant literature in higher education is generated, for example, by various commissions, the American Council on Education and its constituent associations, the College Entrance Examination Board, and the National Student Association. Consequently, there is considerable duplication in this literature.

Hopefully, this bibliography, or some such document, can shorten dissemination lags and duplication, enabling the examination and creation of alternative futures for learning which build on the work of others (as scholarship has always done), rather than continuously rediscovering contemporary fashions in thinking.

D. RECOMMENDATIONS FOR FURTHER WORK

This bibliography is not only incomplete, but, as indicated in table 1, it is subject to rapid obsolescence. Indeed, the most significant literature on alternative futures for learning is probably in typewriter carriages and galley proofs. If the reader has found this compilation to be of value, he can readily appreciate the need for a comprehensive, transdisciplinary, global information system for educational policymakers that can drastically cut dissemination lags, as well as anticipate many forthcoming publications. Such an investment would certainly repay itself many times over in the upgraded quality of consequent research and decisionmaking.

In addition to elaborating the present line of work, there is much to be done in the way of integrating the extant literature. The documents arrayed here in categories such as manpower requirements, youth and youth culture, urban schools, disciplines and professions, and finance, could very well be subjected to overview studies that point out similarities and differences. A history of 20th century educational forecasting, utilizing pre-1960 or pre-1965 documents, would be an invaluable aide to recognizing how forecasters in the past have been reasonably accurate or egregiously wrong. The ratio of pontificators to integrators is far too lopsided, and it is hoped that there will be many more overviews in the future, such as Mayhew on the literature of higher education (809), Bakdikian on the media (645), and Ladd on institutional self-studies (750).

In addition to annotations and overviews, there is also a need for literature that is popularized on various levels for various audiences. Silberman's "Crisis in the Classroom" (243), for example, could be reduced from its 542 pages (which sells well among the literate book-reading public) to a 100-page paperback with photographs and diagrams that clearly illustrate the advantages of informal education. Such popularizations (also utilizing other media) will not necessarily reach every citizen or be accepted, but they should at least be available for those who are interested. Multilevel knowledge (similar to the three editions of the U.S. Government budget) will hopefully become more widespread in the future. At present, we are far from a comprehensive system of knowledge dissemination.

E. ANNOTATED BIBLIOGRAPHY AS A FORECASTING METHOD

Among professional futurists, the Delphi method is a fashionable procedure for exploring the future. There is, of course, considerable value to a succession of questionnaires being answered by an anonymous panel of experts—perhaps the greatest advantage being the simultaneous expression of opinion on any single event or trend.

But there are also several distinct advantages of annotated bibliography. Whereas the participants in a Delphi panel are selected by the conductor of the exercise, and further selected by their willingness to participate, the "participants" in a bibliography include all those who have put their notions of alternative futures into print. (However, one advantage of the Delphi is to select those experts who may have work-in-progress, or who have not written extensively). Moreover, there are no leading questions. Thus a widespread duplication of viewpoint (as in the basic, long-term multifold trend in education), indicates a genuine, rather than a forced consensus. An annotated bibliography is, after all, a collective portrait of our images of the future, which, as Polak indicates (664), will serve to determine our future.

Ideally, an annotated bibliography will be used in conjunction with the Delphi and other forecasting methods. For the Delphi, it is not only a source for generating questions, but a guide to selecting participants. Differences in the literature might be resolved or highlighted, not only by integrative overviews, but by bringing all those who have written about youth and youth culture, for example, to serve as a Delphi panel. Those not willing to participate could nevertheless be cited, especially if they hold radically divergent views.

F. ACKNOWLEDGMENTS

Several major sources of information should be credited. I have benefited from the listings of new publications in the New York Times, "The Chronicle of Higher Education, Science," Saturday Review, and "Subject Guide to Forthcoming Books." Considerable help has been added through the library of the Educational Policy Research Center at Syracuse and the associated services of Mary E. O'Neill, the bibliographic work of Billy Rojas (808), and the bookshelves of my colleagues at EPRC which have been available for my inspection.

I am also indebted to editorial comments by Donnelly J. Barclay, and, above all, I wish to express my deep appreciation for the dedicated and exemplary work of Aina Sanders in preparing the manuscript.

I. GENERAL

A. SOCIAL CHANGE AND SOCIAL GOALS

1. Michael, Donald N. *The Unprepared Society: Planning for a Precarious Future.* Foreword by Ward Madden. The John Dewey Society Lecture—No. Ten. N.Y.: Basic Books, 1968. 132 pp. $4.95.

   An excellent introduction explaining the need for looking at the future—who does it, how it is done, and problems encountered The final chapter, "Some Challenges for Educators," discusses implications for education, eg.: "We must educate so people can cope efficiently, imaginatively, and perceptively with information overload." (p. 108). Recommended.

2. Toffler, Alvin. *Future Shock.* N.Y.: Random House, 1970. 505 pp. $8.95. Bib., pp. 461–483.

   Future shock is the disease of change, the dizzying disorientation brought on by the premature arrival of the future . . . culture shock in one's own society . . . the malaise, mass neurosis, irrationality, and free-floating violence already apparent in contemporary life are merely a foretaste of what may lie ahead unless we come to understand and treat this disease." (p. 13).

   The sources come from increasing transience, novelty, and diversity, Transience involve, the throw-away society, the new nomads (or the declining significance of place to human life), modular man (who has modular relationships with many, rather than holistic relationships with a few), the coming post-bureaucratic ad-hocracy, and the obsolescence of information. The novelty ratio (between the familiar and the unfamiliar) is growing, and, with the aid of science, an economy geared to the provision of psychic gratification and incorporating new family relationships is becoming increasingly dominant. Diversity has led us to overchoice, a surfeit of subcults in the world of work and play, and a diversity of life styles enabling serial selves. This accelerating pace leads to serious physiological problems, and inappropriate psychological responses such as denial, specialism, obsessive reversion (both right-wing and left-wing) and super-simplifying.

   Numerous strategies for survival are proposed for individuals (personal stability zones, crisis counseling, halfway houses, enclaves of the past, and enclaves of the future), technological control, social futurism (including comments on the collapse of technocratic planning and the need for social futures assemblies to salvage the system of representative politics) and education, which is seen as a hopeless anachronism. Although education is admittedly undergoing rapid change, "much of this change is no more than an attempt to refine the existent machinery, making it ever more efficient in the pursuit of obsolete goals." (p. 359). Toffler advocates a Council of the Future in every school and community, provision for lifelong education, and developing common skills of learning, relating, and choosing, while extending superindustrial diversity.

   This challenging overview at times appears glib, especially with its zippy chapter headings and subheadings. It is written for a broad audience, but backed by considerable research, including a bibliography of 359 items. And it raises some very important questions. Recommended.

3. Drucker, Peter F. *The Age of Discontinuity: Guidelines to Our Changing Society.* N.Y.: Harper & Row, 1969.

An important book focusing on four major discontinuities: new technologies, the world economy (including a chapter on The Global Shopping Center), a society of large organizations (including a chapter on “The New Pluralism”), and the changed position and power of knowledge such that we are becoming a knowledge society—the greatest of the discontinuities around us. This final section on knowledge (chapters 12–17) is of immense importance to educators.

Drucker forecasts that the knowledge industries will account for one-half of the total national product in the late 1970's (p. 263), and argues that knowledge, rather than agriculture and mining, has now become the primary industry supplying the essential and central resource of production. Under these circumstances, “It is not that we cannot afford the high costs of education: we cannot afford its low productivity,” (p. 334) and economic necessity will therefore force a revolution. “In a knowledge society, school and life can no longer be separate.” (p. 324). The diploma curtain is seen as a problem, as is the prolongation of adolescence by the schools and the inherent conflict between extended schooling and continuing education.

Because of our knowledge needs, “We face an unprecedented situation in which we will have to set priorities for new knowledge,” (p. 365) and the existing disciplines will not remain appropriate for long, if knowledge is to have a future. Recommended.

4. Bennis, Warren G. and Philip E. Slater. *The Temporary Society.* N.Y.: Harper & Row, 1968. 147 pp.

Six separate essays by one or both of the authors “to force into view certain changes affecting vital aspects of our key institutions: organizational life, family life, interpersonal relationships, and authorizational life, family life, interpersonal relationships, and authority.” In the first essay, democracy is seen as inevitable—the necessary social system of the electronic era. In the second essay, Slater looks at change and the democratic family, noting that “experimental chasms between age cohorts serve to invalidate parental authority.” (p. 24) The topics that follow concern the new style organizations beyond bureaucracy, social consequences of temporary systems, and new patterns of leadership for adaptive organizations. In the final chapter on the temporary society, the necessary education is prescribed for the art and science of being more fully human: how to get love, to love and to lose love; how to enter groups and leave them; how to attain satisfying roles; and how to cope more readily with ambiguity. “For the most part we learn the significant things informally and badly, having to unlearn them later on in life when the consequences are grave and frightfully expensive, like a five-day-a-week analysis.” (p. 127). Recommended.

5. Lindberg, Ferdinand. *The Coming World Transformation.* Garden City, N.Y.: Doubleday, 1963. 395 pp.

A broad and sophisticated assessment of basic social trends, in many instances seen within the span of the next 150 years. The second chapter provides a good history of future study, and the third chapter discusses various aspects “toward a general theory of social prediction.” Major attention is given to population, economics, government, and education, with the final chapter paying briefer attention to the prospects of marriage and the family, the city, recreation, religion, medicine, the sciences, the judiciary, and the future of prognostics (which is seen as practically certain to become a regular university discipline).

The most noteworthy attribute of this overview is the major attention that is paid to learning needs and brain power as a matter of national survival, so much that a meritocracy is seen, with the 21st century as “the era of the savant,” and continuing adult higher education for the elite as the largest segment of the educating system. This “entirely new mentally different governing class” will be selected by IQ (a measure that is disputed at present . “The New Upper Labor Force” (pp. 256–264) discusses trends in various specialties.

Western government will become a gigantic social service institution, and in the U.S. government will be completely centered in the national capital. “The pressure of overpopulation against resources in the backward countries makes it certain that the prospects for the spread of liberal government in the world are extremely dark.” (p. 119). Recommended.

6. Chase, Stewart. *The Most Probable World.* N.Y.: Harper & Row, 1968. 239 pp.

   A popular overview considering the consequences of technological change. The final chapter, "No Path But Knowledge," outlines a desirable curriculum for the education of future leaders, and proposes a supranational agency "to evaluate and screen the consequences of large technological innovations before they go into mass production, seriously to affect the culture." (p. 209).

7. Goodman, Paul. *New Reformation: Notes of a Neolithic Conservative.* N.Y.: Random House, 1970. 208 pp. $5.95.

   "My subject is the breakdown of belief, and the emergence of new belief, in sciences and professions, education, and civil legitimacy . . . By 'Reformation' I mean simply an upheaval of belief that is of religious depth . . . The crisis of legitimacy is deeper than political revolution; it is what I have here been calling religious: the young have ceased to 'believe' in something, and the disbelief occurs at progressively earlier years." (pp. x–xi, 127)

   Although "rather sour on the American young," Goodman has even stronger words (as usual) on the school system, which is seen as "manned by the biggest horde of monks since the time of Henry VIII." (p. 21) The widening wisdom of the times—that children must learn to learn—"usually means picking up the structure of behavior of the teachers and becoming expert in the academic process. In actual practice, young discoverers are bound to discover what will get them past the College Board examinations." (p. 78)

   "By and large, though not for all topics and all persons, the incidental process of education suits the nature of learning better than formal teaching." (p. 69) Accordingly, Goodman's suggested "Reformation" of education includes incidental education as the chief means of learning and teaching, eliminating most high schools, college training following entry into the professions, and delaying socialization to protect children's free growth. "Our aim should be to multiply the paths of growing up, instead of narrowing the one existing school path." (p. 87) For ages 6–11, a system of radically decentralized tiny schools is proposed, each with 28 children and 4 teachers (a licensed teacher, a college senior, a literate housewife and mother, and an intelligent high school graduate or dropout). Due to savings of top-down administration, special services, and construction, it is estimated that the costs would be 25 percent of present urban school costs. (p. 99) (Perhaps this is overstated, but such a scheme may yet be tried by the financially desperate cities.) Recommended

8. Kostelanetz, Richard (ed.). *Beyond Left and Right: Radical Thought for Our Time.* N.Y.: William Morrow, 1968. 435 pp. $7.95.

   An excellent anthology that defines "radical" in the innovative sense, rather than the political sense. A good instruction to futures is provided through a provocative selection of articles by Boulding, Fuller, Kahn, Wiener, McLuhan, Bell, and others, as grouped in the categories of man and his future, technology and society, enterprise and remuneration, architecture, people and resources, education, defense, and redesigning society. Recommended

9. Perkiss, Victor C. *Technological Man: The Myth and the Reality.* N.Y.: George Braziller, 1969. 352 pp. Bib., pp. 295–327.

   A political scientist looks at the vast changes transforming society, and attacks the "myth of the future," which focuses on what is to come rather than what it is. (pp. 10–16)

   He concludes that "Technological man is more myth than reality . . . Bourgeois man is still in the saddle . . . At the same, an existential revolution is underway that may destroy the identity of the human race, make society unmanageable and render the planet literally uninhabitable. Bourgeous man is incapable of coping with this revolution. The race's only salvation is in the creation of technological man. (p. 245) To survive, a new philosophy is required, involving the new naturalism, the new holism, and the new immanentism. (p. 252)

   Chapter 4, "The Prophets of the New" provides an excellent critique of prominent writers such as Ellul, McLuhan, Teilhard de Chardin, Skinner, Landers, and Marx. The unannotated bibliography lists about 500 books and 400 articles on technology, social change, and the future. Recommended

10. Carroll, James D. "Noetic Authority," *Public Administration Review.* 29:5. September–October, 1969. pp. 492–500.

"This paper suggests that the state is withering away in a psychological sense because of an increase in awareness in contemporary society and a growing questioning of authority. It also suggests the state is withering in a technological sense because of a failure to use organized knowledge to satisfy expectations and values. It then suggests that a new form of the state, the 'innovative state' characterized by a new form of authority, may in time emerge." (Abstract). "Noetic" refers to "the increase in awareness—consciousness—of man's social and physical environment that is occurring throughout much of the world." (p. 492). Noetic politics is the politics of knowledge and awareness in an increasingly complex society that is shifting to a mental base of operations and a collegial form of authority. The implications for educating institutions are not discussed, but are obviously profound. RECOMMENDED

11. Zijderveld, Anton C. *The Abstract Society; A Cultural Analysis of Our Time.* Garden City: Doubleday, 1970. 198 pp. $5.95.

Discusses modern society and the protest against it by gnosticists, anarchists, and activists.

12. Platt, John. "What We Must Do," *Science,* 1966: November 28, 1969; pp. 1115–1121.

A concise and powerful overview of the multiple crises that we are confronting, with the view that "it has now become urgent for us to mobilize all our intelligence to solve these problems if we are to keep from killing ourselves in the next few years." Two overview charts are provided (for the U.S. and the World), indicating the priority of problem areas and the estimated time to crisis, broken down in three future periods (1–5 years, 5–20 years, and 20–50 years). For the U.S. the problem areas, in order of priority are total annihilation, great destruction or change (physical, biological, or political), widespread almost unbearable tension (slums, race conflict), large-scale distress (transportation, urban blight, crime), tension producing responsive change (water supply, privacy, drugs, marine resources), other problems important but adequately researched (military R. & D., new educational methods), exaggerated dangers and hopes (mind control, heart transplants), and noncrisis problems being overstudied (man in space and most basic science). It is concluded that "The task is clear. The task is huge. The time is horribly short. In the past, we have had science for intellectual pleasure, and science for the control of nature. We have had science for war. But today, the whole human experiment may hang on the question of how fast we now press the development of science for survival."

Although this is one man's list of priorities, it is critically important that more thinking be generated along these lines. Although education is not directly mentioned in this article, the implications should be obvious. Recommended

13. Platt, John R. *The Step to Man.* N.Y.: Wiley, 1966. 216 pp.

Thoughtful essays by a biophysicist on the evolving nature of man. See especially Chapter 1 "Where Will the Books Go?" in which microlibraries are forecast as "a familiar system within everyone's reach . . . a memory and the beginnings of a universal brain for the whole human race." In the title essay, it is argued that change cannot continue at the present rates, that many areas are already "past the middle of the S curve," and that we are in the middle of a "unique transitional crisis . . . as we make the jump from an undeveloped scientific and technological society to a fully developed one. (p. 187).

14. Educational Policy Research Center at Stanford. *Alternative Futures and Educational Policy.* Menlo Park, Calif.: Stanford Research Institute, EPRC Memorandum Report, January 1970. 43 pp.

Tentatively summarizes the findings of a preliminary set of alternative future histories prepared at EPRC/Stanford, and suggests implications for educational policy. Of some two score future histories (ranging from Manifest Destiny and Exuberant Democracy to Authoritarian Recession, "1984" Theocracy, and Collapse) "there are very few which manage to avoid one or another kind of time of serious troubles between now and 2050. The few that do require a dramatic shift of values and perceptions with regard to what we came to term the 'world macroproblem.' This macroproblem will be the predominant concern of the foreseeable future, for all the alternative paths. It is the composite of all the problems which have been brought about by a combination of rampant technology application and industrial development together with high population levels." (p. 6).

"The overall message is clear. It is not yet time to redesign education for escstatic individuals in a carefree world. To the extent that one believes that the analysis of the roots of the "world macro-problem" holds up, to that extent he will believe that the paramoun educational task for the developed world is the radical altering of the dominant basic premises, perceptions, images, and values of the culture and that the paramount task for the nation is the development of a sense of purpose and unity. To that extent, also, it will seem essential that we re-examine all our present educational institutions, practices, and commitments to determine how their priority is altered in view of these future outlooks." (p. 42). Recommended.

15. Fuller, R. Buckminster. *Operating Manual for Spaceship Earth.* Carbondale: Southern Illinois University Press, March 1969. 143 pp. $4.25; New York: Pocket Books, November 1970. 127 pp. $1.25.

Cryptic, audacious, brilliantly simple, (or simplistically naive?), this short piece of long-distance thinking is hardly an operating manual but possibly a preface to one. Fuller is against nations and politicians, ignorance-invented race distinctions, established ideologies that assume material scarcity, and academic specialization that may hasten our extinction. Rather, a new, physically uncompromised, metaphysical initiative of unbiased integrity could unify the world (p. 32). This will come about by the computer replacing man as a specialist, with man being forced to reestablish, employ, and enjoy his innate comprehensivity (p. 40). Those who are consequently unemployed will be given a life fellowship in research and development or in just simple thinking. Once problems are approached on a universal general systems basis, the resulting world industrialization will benefit all of humanity. This all brings us to a realization of the enormous education task which must be successfully accomplished right now in a hurry . . . (p. 113). Indeed.

16. Theobald, Robert (ed.). *An Alternative Future for America II.* Revised and Enlarged Edition, Chicago: Swallow, May 1970, 199 pp. $6.00; paper $2.00.

Two-thirds of the book incorporates new material, including a "working appendix" listing various organizations studying alternative futures. Education (pp. 157–182) is defined as "the process of providing each individual with the capacity to develop his potential to the full." Four levels of learning are viewed: The first level is the simple perception of a fact; the second occurs when two facts are interrelated; the third (to which present systems of education are geared) makes it possible to improve our level of performance within our present perceptions of the state of the universe. We are beginning to perceive the need for fourth-level learning which permits us to change our perceptions about the nature of the world in which we live . . . the styles which make possible fourth-level learning are profoundly contradictory to those needed in third-level situations."

17. Gordon, Kermit (ed.). *Agenda for the Nation.* Washington: The Brookings Institution, 1968. 620 pp.

Eighteen essays on the urgent issues of the day, including Investing in Better Schools, by Ralph W. Tyler and New Challenges to the College and University," by Clark Kerr.

18. Gardner, John W. *The Recovery of Confidence.* N.Y.: W. W. Norton, 1970. 189 pp. $5.00.

Gardner's fourth book of incomparably cogent wisdom for our times—in this instance, directly facing a multitude of issues that are central to the problems that we face, with chapters on the redesign of institutions, dissent, society and the individual, individuality and community, leadership and common purpose, self-contempt and hope, the renewal of values, and what we can do. An appendix deals specifically with problems of cities, but the insights throughout the book are appropriate for any human organization, for all are seen as requiring renewal. Yet, "We find our institutions caught in a savage crossfire between uncritical lovers and unloving critics." (p. 25). To foster necessary and productive dissent, Gardner advocates more technically expert dissent, building evaluative processes into organizations, and developing complaint and appeal procedures that will permit the clientele of any institution to seek redress of grievances. There is also advocacy of releasing individual potentialities, self-discipline, pluralism, hope, etc. However, there are no cliches here; "Our problem is not to find better values but to be faithful to those we profess." (p. 131). Recommended.

19. Gardner, John. *No Easy Victories.* N.Y.: Harper & Row, 1968. 177 pp.
    A collection of excerpts from Gardner's speeches and writings. Although there is no ostensible purpose, other than presenting the best of Gardner the bits and pieces cohere together quite well, and practically all of them have important insights about the future of our society and the necessary directions for effective action. Particular attention is paid to education (pp. 67–112) for it is felt that "in terms of our national future, teaching is the most important profession." (p. 95). The comments concerning lifelong learning, which has "no adequate reflection in our social institutions," are especially of interest. Gardner's elegant, inspiring, and simple prose is at its best here.
20. Gardner, John. *Self-Renewal: The Individual and the Innovative Society.* N.Y.: Harpers & Row, 1963. 141 pp.
    A lucid and powerful essay advocating "The Ever-Renewing System" and "Educating for Renewal." Recommended.
21. National Goals Research Staff. *Toward Balanced Growth: Quantity with Quality.* Washington: USGPO, July 1970. 222 pp. $1.50.
    Outlines options open to policymakers and advantages and disadvantages of various actions in areas of population growth and distribution, environment, education, consumerism, technology assessment, basic natural science, and economic choices.

    The introduction by Daniel Moynihan discusses the movement from program to policy-oriented government. The overall theme of balanced growth seeks a more interdependent development, as opposed to policies in the past that "have dealt in a largely independent fashion with specific objectives in their own context." Although judged by some to be overly equivocal, this important document suggests a new direction in public decision-making. The tone contrasts quite markedly, for example, with the certitude of purpose in *Goals for Americans: Programs for Action in the Sixties* (Item 24).
22. Schultze, Charles L. with Edward K. Hamilton and Allen Schick. *Setting National Priorities: The 1971 Budget.* Washington: The Brookings Institution, 1970. $6.50; paper, $2.95.
    Examines the facts, figures, and alternatives on both sides of the President's budget proposals in critical areas such as defense, education, law enforcement, pollution control, and transportation.
23. Lecht, Leonard A. *Goals, Priorities, and Dollars: The Next Decade.* N.Y.: The Free Press, 1966.
    An initial effort by the National Planning Association Center for Priority Analysis to reconcile aspirations (based on the 1960 report of the Commission on National Goals) and resources. Education, as one of the major national concerns, is costed out in a somewhat unimaginative style.
24. *Goals for Americans: Programs for Action in the Sixties.* The Report of The President's Commission on National Goals. Administered by The American Assembly. Englewood Cliffs, N.J.: Prentice-Hall, Spectrum Books, 1960. 372 pp.
    Although nearly a decade old, this authoritative collection of essays still remains a classic. See especially Chapter 3, "National Goals in Education," by John W. Gardner.
25. U.S. Department of Health, Education, and Welfare. *Toward A Social Report.* Washington: USGPO, 1969. 101 pp. $.55.
    The first attempt by the federal government to systematically measure the social well-being of the U.S. and an important preliminary step toward a regular system of social reporting. Seven areas have been selected for initial study with the aid of existing data: health and illness, social mobility, physical environment, income and poverty, public order and safety, participation and alienation, and learning, science, and

art. In the latter category, it is tentatively concluded (on the basis of limited data) that children are learning more than in the past, but that we could do much better. It is pointed out that *The Digest of Educational Statistics* has virtually no information on how much children have learned, (the National Assessment of Educational Progress may soon supply some data to this end). A concluding appendix discusses "How can we do better social reporting in the future?" with comments on the deficiencies of existing statistics, the need for new social indicators, and the development of policy accounts (or meaningful integrations of social indicators). Recommended.

26. Gross, Bertram M., (ed.). *Social Intelligence for America's Future: Explorations in Societal Problems.* Boston: Allyn and Bacon, Inc., 1969.

    A collection of authoritative articles on social indicators and the need for additional indicators. This volume is the hard cover marriage of the two volumes of The Annals of the American Academy of Political and Social Science entitled *Social Goals and Indicators for American Society.* (Vol. 371, May 1967; Vol. 373, September 1967).

    Especially see Wilbur J. Cohen, "Education and Learning" (ANNALS, Vol. 373), which provides an excellent overview of education, introduces the concept of "the learning force," and points out the many areas where new educational indicators are needed.

27. Sheldon, Eleanor Bernert and Wilbert E. Moore (eds.). *Indicators of Social Change: Concepts and Measurements.* N.Y.: Russell Sage Foundation, 1968.

    An authoritative work by and for sociologists. Especially see Daniel Bell, "The Measurement of Knowledge and Technology," (pp. 145–246) and Beverly Duncan, "Trends in Output and Distribution of Schooling" (pp. 601–672, 32 tables). The Bell article, a far-ranging essay covering implications of knowledge growth in a post-industrial society, is especially recommended.

28. Bell, Daniel (ed.). *Toward the Year 2000. Work in Progress.* N.Y.: Houghton Mifflin, 1968. 400 pp. Originally published by American Academy of Arts and Sciences in *Daedalus*, Summer 1967.

    Deliberations of the Commission on the Year 2000. Five of the 22 articles involve education and education-related topics, while four others discuss futures methodology. Although well publicized, these essays do not appear to be especially superior to those of any other anthology on the future. But this is "Work in Progress," foreshadowing a series of 8 volumes that will appear over the next 2–3 years, starting with Harvey Perloff (ed.), *U.S. Government in the Year 2000.* Other volumes will cover Values and Rights (Fred C. Ikle), Intellectual Institutions (Stephen Graubard), The Life Cycle (Kai Erickson), The International System (Stanley Hoffman), The Social Impact of the Computer (Robert M. Fano), Science and Society (Franklin Long and Robert Morison), and Business Institutions (Martin Shubik). Some of the volumes will be by a single author, while others will include contributed papers and discussions.

29. Jungk, Robert and Johan Galtung (eds.). *Mankind 2000.* Oslo: Universitetsforlaget; London: Allen & Unwin, 1969. 368 pp. $14.90.

    Papers presented at the First International Future Research Conference at Oslo, 1967. The first array of writings from the international "invisible college" of professional futurists.

30. *Papers of the International Future Research Conference, 1970.* Kyoto, Japan: IFRC, Kyoto International Conference Hall, Takara-Ike, Sakyo-Ku, 1970. $31.50 plus $4.00 postage for complete set of 65 papers. Papers may be ordered separately at $.50 each. List available from IFRC.

    The English language papers (to be subsequently published), are in eight categories as follows:

    1. The Role of Futures and Future Research (7 papers)
    2. Research Methodology (7 papers)
    3. Technological Innovations and Social Change (12 papers)
    4. Education for the Future (11 papers)
    5. Environmental Changes—Time and Space (8 papers)
    6. New Values: New Man (7 papers)
    7. Social Systems and Social Innovation (5 papers)
    8. World Futures (8 papers)

31. Morphet, Edgar L. and Charles O. Ryan (eds.). *Prospective Changes in Society by 1980.* Designing Education for the Future—An Eight-State Project. Vol. I. N.Y.: Citation Press, 1967. 268 pp.

32. Morphet, Edgar L. and Charles O. Ryan. *Implications for Education of Prospective Changes in Society.* Designing Education for the Future: An Eight-State Project, No. 2. N.Y.: Citation Press, 1967. 323 pp.

    Twenty articles, largely by professional educators, responding to Volume I of this series, *Prospective Changes in Society by 1980.*

33. Gordon, Theodore J. and Robert H. Ament. *Forecasts of Some Technological and scientific Developments and their Social Consequences.* Middletown, Connecticut: The Institute for the Future, IFF Report R–6, September 1969. 98 pp.

    The Delhi method involves a questionnaire mailed to a panel of experts who, after several iterations, tend to produce a converging group consensus—in this instance, on important prospective agents, when they might take place, societal consequences, and the degree to which they are likely to be beneficial or detrimental, and the degree to which intervention appears feasible.

    The panelists ruminated on 32 physical events, including the following (median date of 50 percent chance of occurrence in parentheses): central data storage facility with wide public access (1980); language translators (1980), sophisticated teaching machines responsive to student's physiology (1980), individual portable two-way communication devices (1990), and 3–D television (1990). Similarly, 44 biological events were considered, including cheap nonnarcotic drugs for producing specific personality changes (1980), laboratory creation of artificial life (1980), relatively inexpensive techniques to increase the world's arable acreage by 50 percent (1990), the ability to stimulate maximum cognitive growth of preschool children (1995), and chemical control of the aging process (2015).

    In addition to the elaboration of consequences for each of these events, three scenarios are constructed by the authors of the technological world in 1985, 2000, and 2025. The overall conclusion is that "Taken together, the forecasted events, the expected consequences, and the suggested strategies which might be employed in manipulating them, tell of a changing world in which man is gaining more precise control over his environment, his information, and himself; a world in which the new control techniques will increase comfort, eliminate some human misery, increase military power, and increase knowledge, but which will concomitantly bring political and social problems of unprecedented dimensions; a world in which the techniques for coping with these problems will not be much more advanced than they are today." (pp. 7–8)

    These forecasts, however, should not be taken as Revealed Truth. (See Weaver, Item No. 667 for qualifications to the methodology). Nevertheless, this broad array of possibilities should be considered, if for no other reason than as a compact listing of scientific aspirations circa 1969. Highly recommended.

34. De Brigard, Raul and Olaf Helmer. *Some Potential Societal Developments,* 1970–2000. Middletown, Conn.: Institute for the Future, IFF Report R–7, April 1970. 134 pp.

    Unlike IFF Report R–6 (above), which has precedents back to the original Gordon and Helmer RAND study of Sept. 1964, this report concerns the first attempt to employ the Delphi method in forecasting societal developments. Adding to this lack of scientific precedent is the inherent difficulty of accurately gauging social matters in the present, let alone the future.

    Nevertheless, the authors have forged ahead, providing substantial qualification to their effort. Potential developments are assessed in major categories of urbanization, the family, leisure and the economy, education, food and population, international relations, conflict in society and law enforcement, national political structure, values, and the impact of technology on government and society. In some instances, convergent opinions were obtained (e.g., inexpensive and uncomplicated mass contraceptive devices will be available, education will become much more decentralized and diversified), while in other instances there was wide disagreement (e.g., the alienation and impersonality of urban life will increase, widespread famine will occur). At the end of each of the ten sections, there is a brief but valuable discussion of "some policy issues raised by the preceding expectations." In the final section of the report the panelists estimated to the year 2000 the course of 46 statistical indicators such as GNP, divorc rate, expenditures for education, life expectancy, income levels, overseas travel, etc.

Being an initial effort, this panel was limited to 43 members—hardly enough, in light of the multitude of topics explored, to focus a ballanced array of opinion on any one question. Aside from providing a substantial listing of largely unconnected events, the chief value of this document is as an exercise in futures methodology that may serve to influence future applications of the Delphi technique. Recommended

B. IMPACTS OF TECHNOLOGY

35. National Commission on Technology, Automation, and Economic Progress. *Technology and the American Economy.* Vol. I. Washington: GPO, February 1966. 115 pp.

The overall conclusion of the Commission is that "our society has not met the challenge of technical progress with complete success. There is much to be done." (p. 6) Of the many recommendations for facilitating adjustment to change, those concerning education are among the most important: universal high school graduation, free public education through grade 14, an open-ended system of education stressing lifelong learning, etc. Chapter 9, "Improving Public Decision Making," has an excellent discussion of the role of "social accounting," systems analysis, and "inventing the future." Recommended

36. Muller, Herbert J. *The Children of Frankenstein: A Primer on Modern Technology and Human Values.* Bloomington: Indiana University Press, 1970. 431 pp. $10.00.

A balanced, "informal" volume by a well-known "nonprofessional historian" (presently a Professor of English and Government) who addresses "the general reader." The view of technology is that the consequences have been "profoundly, thoroughly mixed," in contrast to Ellul, whose totally negative view is rejected as overstated and oversimplified. After providing historical background, the impact on society and culture is explored in separate chapters on war, science, government, business, language, higher education, natural environment, urban environment, mass media, the traditional arts, religion, and people. The chapter on higher education observes the consequences of specialization and "the spell of scientific methods," with the view that "most college graduates—whatever their specialty—have too limited an understanding of our technological society for potential leaders." (p. 230) The final three chapters are under the heading "Toward the Year 2000," examining utopian writers of the past, the individual papers from the Commission on the Year 2000, and Kahn and Wiener's *The Year 2000.* A concern for human nature and recurrent human values is expresed throughout, and it is concluded that the Brave New World of Huxley "looks like a real possibility, considering the nature of technological man and affluent man in America." (p. 405) As suggested by the subtitle, this volume should serve well as a primer, despite some rambling, a reticence to forecast, and some curious notions, e.g., "most middleclass teenagers appear to be basically satisfied with themselves and their prospects, by no means alienated from their society." (p. 364. This may have been truer in 1968 when written than in 1970 when published.)

37. Buerrum, Chresten A. "Forecast of Computer Developments and Applications 1968–2000," *Futures,* 1 : 4, June 1969, pp. 331–338.

Results of a Delphi study, with the general consensus that "rapid development of advanced computers and computer applications is expected to continue to the year 2000 and result in much more influence on society than today." (p. 335) Some of the forecasts: a 50% reduction of the labor force in present industry by the late 1980's, all major industries controlled by computers in the year 2000, patients in major hospitals controlled by computers around 1975, computer prices (despite advanced technology) to decrease by a factor of 100 (!) by the end of the 1980's, etc.

38. Ware, W. H. *Future Computer Technology and Its Impact.* Santa Monica: The Rand Corporation, P–3279, March 1966.

    Predicts an "increased pace in education," frequent retraining and re-education as "the normal way of life," and the computer as "the most important tool ever available for the conduct of research."

39. Rosove, Perry E. *Computers and the Academic Marketplace.* Santa Monica: Systems Development Corporation, SP–2819, April 10, 1967. 14 pp.

    Looks at progress in man-job matching (NEA has already established a computerized personnel referral system) and looks to the next decade when "we can forsee at least three major computerized placement systems serving the needs respectively of higher education, elmentary and secondary education, and vocational education."

40. Burke, John G. (ed.). *The New Technology and Human Values.* Belmont, Calif.: Wadsworth Publishing Co., 1966. 408 pp.

    A well-organized introductory reader including a section on "Education in a Technological Era," and a focus on problems such as leisure, automation, population, privacy, and government. Recommended.

41. Caldwell, Lynton K., assisted by William B. DeVille and Hedvah L. Shuchman (eds.). *Science, Technology, and Public Policy: A Selected and Annotated Bibliography* (2 volumes). Prepared for the National Science Foundation by the Program in Public Policy for Science and Technology, Department of Government. Bloomington: Indiana University, revised edition, 1969. 492 pp. and 544 pp. respectively.

    This massive and valuable reference work contains an estimated 5000 items, with annotations of varying length for each, and classified in 12 major sections and 46 subsections. "To provide a definition treatment limited to publications in English for the years 1945–67 would increase the size of the bibliography by at least half. The size might easily be doubled if relevant editorials and articles in news magazines and in popular journals were included." (Vol. II, p. i) Recommended

42. San Francisco State College Center for Tecnological Education. *Technology and Education in the 21st Century.* Washington, D.C.: Communication Service Corporation, 1967. 107 pp.

    Seven articles resulting from a symposium; interesting, but not about the 21st Century.

C. MANPOWER REQUIREMENTS

43. Chorafas, D. N. *The Knowledge Revolution: An Analysis of the International Brain Market.* London: George Allen & Unwin, 1968; New York: McGraw-Hill Paperbacks, 1970. 142 pp. $2.45.

    "This book has been written to discuss Europe's economic and cultural future against the whole background of the world market for brains. It examines the role of industry, governments and universities in meeting the challenge of the 1970's and thereafter.

    The realization that a modern economy's most important capital resource is not money, raw materials, or equipment but brains has been slow in coming. This fact is the kernel of the Knowledge Revolution . . . Human brain power is the key to the future . . ." (p. 13)

    Written in a rather popular style, the book argues that the brain drain from Europe is a symptom of the basic disease in the European economic system. By 1970, however, there is evidence to suggest that the net flow of brainpower may be away from the United States. Even so, this book provides a good introduction to an increasingly important problem.

44. Berg, Ivar. *Education and Jobs: The Great Training Robbery.* Foreword by Eli Ginzberg. N.Y.: Praeger (published for the Center for Urban Education), 1970. 200 pp. $7.50.

    A well-researched sociological study of the relationship of education to employment, pointing out that many workers are over-educated, employee productivity does not vary with formal education, job dissatisfaction increases as educational level rises, and that "educational credentials have become the new property in America. Of particular interest is evidence indicating that elementary and secondary teachers are less likely to stay in teaching as they move up the credentials ladder. Unfortunately, Berg only analyzes the single dimension of education and jobs, without suggesting other purposes (such as citizenship and individual development) that schools might satisfy. Although there are no trend data or forecasts, and only a hint of policy suggestions, this book nevertheless has broad implications for policy.

45. Machlup, Fritz. *Education and Economic Growth.* Lincoln: University of Nebraska Press, 1970. 106 pp. $4.25.

"Analyzes the effect of educational effort upon productivity, the influences that determine the demand for education, and the reasons why economic growth and higher living standards increase the cost of education per pupil."

46. Bronfenbrenner, Urie. "Damping the Unemployability Explosion: Today's Children Must Be Grown to Fit Tomorrow's Jobs," *Saturday Review*, January 4, 1969. pp. 108–110.

"Already our major problem of manpower is not one of unemployment but of unemployability . . . unless appropriate countermeasures are taken, the proportion of unemployables in our nation is likely to grow at an increasing rate in the decades ahead." (p. 108) Proposes an HEW Office for Family and Children's Services, a national Commission for Children, and neighborhood Centers for Parents and Children which "would offer cooperative group care and educational experience for children from early infancy through preschool age."

47. Lecht, Leonard A. *Manpower Needs for National Goal in the 1970's.* N.Y.: Praeger, 1969. 183 pp. $7.50.

A report of ongoing research by the National Planning Association's Center for Priority Analysis, predicated on the assumption that the U.S. will move ahead to implement national goals in 16 critcal areas: agriculture, area redevelopment, consumer expenditures, education, health, housing, international aid, manpower retraining, national defense, natural resources, private plant and equipment, research and development, social welfare, space, transportation, and urban development. It is concluded that "If we continue to follow present patterns of employment, discrimination, training, and education, our attempts to implement national goals and solve these problems will be hamstrung by substantial labor shortages. Even advanced technology and increased automation will not alter this picture for . . . each new development creates additional manpower demands requiring new skills. Hence, only advance planning in both private and public sectors can alleviate manpower bottlenecks that would cripple new programs at the outset." (book cover) Recommended.

48. Rohrlich, George F. (ed.). *Social Economics for the 1970's: Programs for Social Security, Health, and Manpower.* Cambridge: University Press of Cambridge, Mass., June 1970.

Based on a conference held at the Temple University Institute for Social Economics. Contains six articles analyzing existing and proposed programs.

49. Beer, Samuel H. and Richard H. Barringer (eds.). *The State and the Poor.* Cambridge, Mass.: Winthrop Publishers, Inc., Aug. 1970. 320 pp. $4.50, paper.

"The focus throughout is on responsiveness to the needs of the poor in policy planning and operation at the state level." Offers recommendations for education, manpower, etc.

50. Ginzberg, Eli. *Manpower Agenda for America.* New York.: McGraw-Hill, 1968. 250 pp.

A bland discussion of the evolution of manpower policy, social pathology, and related policy areas.

51. Larkin, Paul G. "The Challenge to Higher Education of National Manpower Priorities," *J. of Higher Education*, 41:3, March 1970, pp. 195–203.

Also see Paul Larkin and John Teeple, "National Employment Goals and Higher Education," *College and University Business*, Oct., Nov., and Dec. 1969.

52. Mangum, Garth L. (ed.). *The Manpower Revolution: Its Policy Consequences.* N.Y.: Doubleday Anchor, 1966. 580 pp. $2.45.

Excerpts from the 1963 hearings of the Senate Subcommittee on Employment and Manpower, with a background on the dimensions of consequences from the manpower revolution and suggestions for solving major manpower problems.

53. Rosenberg, Jerry M. *Automation, Manpower, and Education.* N.Y.: Random House, Studies in Education, 1966. 179 pp. $1.95 paper.
Discusses education's responsibilities under automation, manpower utilization, the jobs of tomorrow (categorized as dead-end jobs, status-quo jobs, and bright-future jobs), teaching the subject of automation, government, training programs, and implications for educators, government, industry, unions, and the community.

54. Folger, John K., Helen S. Astin, and Alan E. Bayer. *Human Resources and Higher Education.* Staff Report of the Commission on Human Resources and Advanced Education. N.Y.: Russell Sage Foundation, 1970. $17.50.
"As the pace of change in our society increases, the need will be even greater for manpower planning to avoid imbalances among the professions and the frustration of individual career plans. This work develops our understanding of the set of interrelated forces that determines the education and utilization of our major national asset—able men and women."

55. Levitan, Sar A. and Irving H. Siegel (eds.). *Dimensions of Manpower Policy: Programs and Research.* Baltimore: Johns Hopkins, 1966. 299 pp. $6.95.
17 original essays dealing with multifaceted developments in the field of human resources, as related to national and local programs.

56. Siegel, Irving H. (ed.). *Manpower Tomorrow: Prospects and Priorities.* N.Y.: Augustus M. Kelley, 1967. 219 pp. $7.50.
Report of a conference commemorating the W.E. Upjohn Institute for Employment Research. "Presents some 50 authoritative statements on the Manpower outlook for the next two decades and on the implications of this outlook for public and private policies, programs, and research."

57. Venn, Grant. *Man, Education, and Manpower.* Washington: American Assn. of School Administrators (1201 16th St., N.W.), 1970. $6.00.
"Discusses the role of education in developing a comprehensive manpower program for an increasingly technological society, (Chron. of H. Ed.)

58. Venn, Grant. *Man, Education, and Work: Postsecondary Vocational and Technical Education.* Washington: American Council on Education, 1964. 184 pp. Bib., pp. 176–184.
Trends and issues in vocational and technical education, with 15 recommendations for national policy.

59. McClelland, David C. and David G. Winter. *Motivating Economic Achievement: Accelerating Economic Development through Psychological Training.* N.Y.: Free Press, 1969. 409 pp. $12.95.

60. Asbell, Bernard. *The New Improved American.* N.Y.: McGraw-Hill, 1963. 222 pp.
A rambling and very popularized discussion of automation, jobs, and learning. Possibly of value to high school students.

61. Committee for Economic Development. *Training and Jobs for the Urban Poor.* CED Statements on National Policy. N.Y.: CED (477 Madison Avenue), July 1970. 78 pp. $1.25.
Evaluates current manpower training and employment efforts by government and business, and recommends new government programs and the establishing of experimental nonprofit Jobs Corporations to provide training and job opportunities for the urban poor.

62. U.S. Dept. of Labor. *Patterns of U.S. Economic Growth: 1980 Projections of Final Demand, Interindustry Relationships, Output, Productivity, and Employment.* Washington: USGPO, 1970. 131 pp. $1.25.
"Presents projections of employment by industry for 1980, based on projections of the labor force, potential gross national product, the composition and industry structure of gross national product, and industry output and output per man-hour." (GPO brochure)

63. U.S. Dept. of Labor, Bureau of Labor Statistics. *Tomorrow's Manpower Needs: National manpower projections and a guide to their use as a tool in developing state and area manpower projections.* Bulletin No. 1606, 4 vols. Washington: USGPO, 1969.
Vol. I, "Developing Area Manpower Projections," 100 pp. $1.00.
Vol. II, "National Trends and Outlook: Industry Employment and Occupational Structure," 121 pp., $1.25.

Vol. III, "National Trends and Outlook: Occupational Employment," 50 pp. 55¢.

Vol. IV, "The National Industry-Occupational Matrix and Other Manpower Data," 247 pp. $2.00.

64. U.S. Dept. of Labor, Bureau of Labor Statistics. *Occupational Outlook Handbook.* Washington: USGPO, 1970. 859 pp. $6.25. 1970–71 Edition.
    Issued biennially, this survey of 700 occupations in 30 key industries projects manpower needs to 1980. Although training requirements are rising, it was found that 8 out of 10 jobs to be filled will be open to young workers with less than a college degree. Professional and technical jobs will increase by 50% over 1968 levels, and service workers will increase by about 40%.

65. U.S. Dept. of Labor. *Manpower Report of the President, including A Report on Manpower Requirements, Resources, Utilization, and Training.* Washington: USGPO, March, 1970. 329 pp. $2.50.
    The annual state of the labor force report with a discussion of recent changes, manpower policy and programs, and ongoing research.
66. International Institute for Educational Planning. *Manpower Aspects of Educational Planning: Problems for the Future.* Paris: UNESCO/IIEP, 1968. 265 pp.
    Covers manpower and educational needs for rural and agricultural development, unemployment of the educated, and the implementation of plans.
67. Shockley, R. J. *Your Future in Elementary School Teaching.* N.Y.: Arco Publishing Co., 1970. $1.95 paper.
    There are an additional 39 vocational guidance books published by Arco and prefaced by "Your Future in . . ." (See *Subject Guide to Forthcoming Books*, 4:6, Nov. 1970, p. 29). One wonders whether these books are oriented to the genuine interests of students and young people, or to employers who seek to recruit the young.
68. Lewis, C. G. (ed.). *Manpower Planning: A Bibliography.* N.Y.: American Elsevier, 1969. 96 pp. $7.25.

D. YOUTH AND YOUTH CULTURE

69. Tanner, J. M. "Earlier Maturation in Man," *Scientific American*, Jan. 1968.
    "Children are reaching maturity at a progressively younger age. In addition to reaching sexual maturity earlier, children are also attaining their maximum height sooner . . . attributed primarily to improved nutrition." (*The Futurist*, Feb. 1969) Also see Walter Sullivan, "Boys and Girls Are Now Maturing Earlier," *The New York Times*, Jan. 24, 1971, p. 1.
70. Goodman, Paul. *Growing Up Absurd: Problems of Youth in the Organized Society.* N.Y.: Random House, 1956; Vintage Books, 1960. 296 pp. $1.45.
    A classic critique, in many respects foretelling (and perhaps instigating to some degree) the present turmoil. "My strategem in this book is a simple one. I assume that the young *really* need a more worthwhile world in order to grow up at all, and I confront this real need with the world that they have been getting. This is the source of their problems. *Our* problem is to remedy the disproportion." (p. xvi) For Goodman's latest observations on youth and other matters, see *New Reformation*, Item No. 7.
71. Mead, Margaret. *Culture and Commitment: A study of the Generation Gap.* N.Y.: Doubleday and Natural History Press, 1970. 113 pp. $5.00; $1.95 paper.
    A wide-ranging essay summarizing much of Mead's thinking over the past decades and adding new insights on our unique present that is without any parallel in the past." The argument easily follows the chapter headings: The Past: Postfigurative Cultures and Well-Known Forbears (where lack of questioning and consciousness are the key conditions); The Present: Configurative Cultures and Familiar Peers (which is institutionalized through age grading); and The Future: Prefigurative Cultures and Unknown Children (where the child represents what is to come). All men are seen as equally immigrants into the new era, and "Today, nowhere in the world are there elders who know what the children know, no matter how remote and simple the societies are in which

the children live. In the past there were always some elders who knew more than any children in terms of their experience of having grown up within a cultural system. Today there are none." (pp. 77–78)

"Postfigurative cultures, which focused on the elders—those who had learned the most and were able to do the most with what they had learned—were essentially closed systems that continually replicated the past. We must now move toward the creation of open systems that focus on the future—and so on children, those whose capacities are least known and whose choices must be left open." (pp. 92–93) Despite a lack of suggestions as to what is to be done with elders, the basic argument is provocative. Recommended

72. Reich, Charles A. *The Greening of America: How the Youth Revolution is Trying to Make America Livable.* N.Y.: Random House, 1970. 399 pp. $7.95. (Condensation in *The New Yorker*, Sept. 26, 1970, pp. 42–111).

The best-seller that attacks the corporate state and its premises as seen by Reich: 1) disorder, corruption, hypocrisy, war; 2) poverty, distorted priorities, and legislation by power; 3) uncontrolled technology and the destruction of the environment; 4) decline of democracy and liberty, powerlessness; 5) the artificiality of work and culture; 6) absence of community; and 7) loss of self.

To indicate the true significance of the new generation, three broad categories of consciousness are discussed: Consciousness I as the traditional outlook of the American farmer, small businessman, or worker trying to get ahead; Consciousness II representing the values of an organizational society—basically "liberal" but with the potential of becoming repressive; and Consciousness III as the new mode of independence and personal responsibility, seeking restoration of the nonmaterial elements of man's existence.

"There is a revolution under way. It is not like revolutions of the past. It has originated with the individual and with culture, and if it succeeds it will change the political structure only as its final act. It will not require violence to succeed, and it cannot be successfully resisted by violence. It is now spreading with amazing rapidity, and already our laws, institutions, and social structure are changing in consequence. Its ultimate creation could be a higher reason, a more human community, and a new and liberated individual. This is the revolution of the new generation." (*New Yorker*, p. 42)

Reich has been widely attacked (by "Con II" people, of course) as a romantic, while "Con III" people undoubtedly find the book as a bible for our times. In any event, "Con III" has rapidly become part of our national idiom. Recommended

73. Roczak, Theodore. *The Making of a Counter-Culture: Reflections on the Technocratic Society and Its Youthful Opposition.* Garden City, Doubleday Anchor, 1969. 303 pp. $1.95.

74. von Hoffman, Nicholas. *We Are The People Our Parents Warned Us Against.* N.Y.: Quadrangle, 1968. 256 pp. $6.95 (Crest paper, 1971)

The searing iconoclast of *The Washington Post* "defines the spirit of the Flower Children and illuminates the much more lasting changes occurring within American youth." (advt.)

75. Braden, William. *The Age of Aquarius: Technology and the Cultural Revolution.* Chicago: Quadrangle Books, 1970. 306 pp. $7.95.

"Armageddon is possible: So is Aquarius." The former would come about from the technicians of the technetronic society; the latter by an effective neo-humanist, which the hippie/drug movement has not provided. Braden, a journalist, has pasted together a vast array of ideas, quotations, and interviews with a wide variety of contemporary social thinkers—including an entire chapter contrasting Bruno Bettelheim and Richard Flacks and their views on youth. Although lacking cohesion and depth, one can find some worthwhile ideas on present trends.

76. Wheeler, Harvey. "The Rise of the Elders," *Saturday Review*, Dec. 5, 1970, pp. 14–15, 42–43.

Foresees, within a few decades, the full or partial conquest of death, resulting in a "middle age" of forty or more years, and a new dominating class of the aged involving those who are presently dominating as youth. Widespread philosophic and political consequences are sketched out.

77. Friedenberg, Edgar Z. *The Anti-American Generation.* Chicago: Aldine, Jan. 1971. $5.95; $2.45 paper.

78. Feuer, Lewis S. *The Conflict of Generations: The Character and Significance of Student Movements.* N.Y.: Basic Books, 1969. 243 pp. $12.50.

    An exhaustive historical account, with no sense of the present social context or of the future. Feuer (who was attacked in Berkeley) contends that an Oedipal pattern of conflict has always existed, but his overt hostility and tunnel vision suggest far more serious problems.

79. Michael, Donald N. *The Next Generation: The Prospects Ahead for the Youth of Today and tomorrwo.* N.Y.: Random House, 1965. 218 pp. (Also Vintage Edition).

    Discussion of many variables over the next 20 years under two major headings: "Conditions Essentially Independent of the Influence of Youth Developers" (economy, technology) and "Conditions Subject to Considerable Influence by Youth Developers" (family, education).

80. Corson, William R. *Promise or Peril: The Black College Student in America.* N.Y.: W. W. Norton, 1970. $4.95.

    Explores the danger of a black revolution in the U.S., drawing parallels with Vietnam.

81. Wein, Bibi. *The Runaway Generation: A Study in Depth of our Alienated Children.* N.Y.: McKay, 1970. $6.95

82. Moore, Allen J. *The Young Adult Generation: A Perspective on the Future.* Nashville: Abingdon Press, 1969. 176 pp. $3.75.

    Explains contemporary developments that are aggravating the generation gap.

83. Pettit, George A. *Prisoners of Culture,* N.Y.: Charles Schribner's Sons, 1970? 291 pp.

    An anthropologist employs a broad evolutionary perspective to analyzing the position of young people in contemporary society. A major concern is with the isolation of the school from the serious daily business of the community.

84. Keniston, Kenneth. "You Have to Grow Up In Scarsdale to Know How Bad Things Really Are," *The New York Times Magazine,* April 27, 1969.

    Behind this innocent title lies a profound explanation of the broad trends resulting in student revolt. Rejecting the "Oedipal Rebellion interpretation of Feuer and the "Historical Irrelevance" theory of Brzezinski and Bell, Keniston sees the fusion of two revolutions. On the one hand, there is a continuation of the old revolution of the industrial society, involving "the progresive extension to more and more people of economic, political, and social rights, privileges and opportunities originally available only to the aristocracy." Affluent youth take these values for granted, seeing them as rights and not as goals. While demanding these rights, a new revolution—consonant with a post-industrial society—is developing. Beyond affluence is a concern with the quality of life and a stress on the values of individuality, participation, openness, and continuing human development.

85. Bronfenbrenner, Urie. *Two Worlds of Childhood: U.S. and U.S.S.R.* N.Y.: Russell Sage Foundation, 1970 (?) $7.95.

    In comparing child-rearing in the two major world powers, the author finds considerable neglect in the U.S. Advocates a Commission on Children to study and redistribute the priorities of our society.

86. Bettelheim, Bruno. *The Children of the Dream.* N.Y.: Macmillan, 1969. 363 pp.

    A thorough report on the Israeli Kibbutzen, an alternative to modern child-rearing practices.

87. Hedgepath, William, and Dennis Stock. *The Alternative: Communal Life in New America.* N.Y. Macmillan; Collier Books, 1970. 191 pp. $3.95.

    A sympathetic account, with many photographs, of the alternative life style favored by what is seen as an increasing number of young Americans.

88. Sutton, Horace. "Drugs: Ten Years to Doomsday?" *Saturday Review,* Nov. 14, 1970, 18+ pp.

    A worried overview of the drug situation with the following conclusion: "Not merely a youthful frivility to be equated with the roarings of the Twenties, not just the trappings of a new world order, not only the enlightened way of life of an untethered generation, the drug epidemic may be the shadow of an end-of-century plague. It may also be one part—the more visible part—of a larger set of socio-medical problems: suicides and alcoholism as well as narcotism, in which few medical advances have been made." (p. 61)

89. Vachon, Brian. "The Jesus Movement is Upon Us," *Look* 35:3, Feb. 9, 1971, pp. 15–21.

    Pop "California forecasting" announcing that grooving on Jesus as a replacement of drug culture "shows every sign of sweeping East and becoming a national preoccupation." (If one has difficulty in imagining such a scenario, consider the utter implausibility in 1960 of drugs and riots).

E. EQUALITY AND SOCIAL SELECTION

90. Gans, Herbert J. "The Equality Revolution." *The New York Times Magazine*, November 3, 1968. 36+ pp.

    Views modern social protest as focused on economic, political, and social inequality. Predicts that "In the years to come, the demand for more equality, democracy and autonomy is likely to spread . . . New York's current struggle over school decentralization is only a harbinger of things to come." (p. 69)

91. Miller, S.M. and Pamela Roby. *The Future of Inequality*. N.Y.: Basic Books, 1970. 272 pp. $7.95.

    Inequality is seen as increasing during the 1970's due to the elimination of unskilled work and the increasing importance of education for all. Only deliberate public policy of compensatory programs could lead to greater equality, and this appears unlikely. Yet, there will be greater sensitivity to inequities, resulting in still more dissent. But the possiility of change is held forth: "What we are suggesting is a radical restructuring capable of appealing to a large number of voters who feel the need for change and do not see the possibility of a politically viable program." (p. 252) Recommended

92. U.S. Senate. Select Committee on Equal Educational Opportunity. *Equal Educational Opportunity.*

    Part 1A: *Equality of Educational Opportunity, An Introduction.* Washington: USGPO, 1970. 413 pp. $1.50.

    Part 1B: *Equality of Educational Opportunity, Appendix.* Washington: USGPO, 1970. pp. 415–741. $1.25.

    Hearings held April 20–29, May 5 and 12, 1970 "to study the effectiveness of existing laws and policies in assuring equality of educational opportunity and to examine the extent to which policies are applied uniformly in all regions of the United States." (GPO brochure)

93. Guthrie, James W., and others. *Schools and Inequality.* N.Y.: The Urban Coalition, 1969.

94. Keppel, Francis. *The Necessary Revolution in American Education.* N.Y.: Harper & Row, 1966.

95. Howe, Harold, Kenneth B. Clark, James E. Allen et. al. *Racism and American education: A Dialogue and Agenda for Action.* N.Y.: Harper & Row, Urban Affairs Series, 1970. 164 pp. $5.95.

96. Hickerson, Nathaniel. *Education for Alienation.* Englewood Cliffs: Prentice-Hall. 1969. 98 pp. Paper.

    "This book will be an attempt to show how our public schools, as mirrors of our society, have played a significant role in creating the conditions that have led to the waste of talent and ability and to the subsequent loss of dignity and self-worth on the part of millions of our citizens." (Preface). Offers 13 proposals for reform, including denying entry into the teaching profession of intolerant teachers and weeding out those who are presently teaching, altering the social science curriculum, eliminating IQ testing, examining ability grouping, bringing families of the poor into the school environment as active participants, strengthening the academic curriculum offered to the economically deprived, continued desegregation, and massive in-service education programs.

97. Gardner, John W. Excellence: Can We Be Equal and Excellent Too? New York: Harper & Row, 1961; Harper Colophon editor. 1962. 171 pp. $1.45.

    A well-known (indeed, perhaps classic) essay on three competing principles (hereditary privilege, equalitarianism, and competitive performance), the search for talent necessitated by our complex society, and the need to select a variety of talents. Recommended.

98. Commission on Tests. Report of the Commission on Tests. I. Righting the Balance (118 pp. $2.00). II. Briefs (194 pp. $3.00). New York: College Entrance Examination Board, 1970. $4.50 for both volumes in boxed set.

Recommends that the College Board should modify and improve its tests and associated services in seeking to serve its distributive, credentialing, and educative functions. It is suggested that the board act for both its traditional institutional clientele and for its student clientele, and that the other half of noncollege-going high school students be served through a job entry testing program and regional centers for guidance in continuing education. Thus, the theme of Righting the Balance in the first volume. The second volume consists of 14 papers by Commission members, serving as background to the many recommendations made. Recommended.

99. Young, Michael. The Rise of the Meritocracy, 1870–2033: An Essay Education and Equality. London: Thames & Hudson, 1958; Baltimore: Benguin Books, Pelican edition, 1961. 190 pp.

A brilliant and witty essay by a sociologist who writes as a sociologist in the year 2033, defending the existing order and providing historical background for government leaders (a short-term forecast is also provided, which proves disastrously inaccurate). Brain-power planning became more effective as the measurement of merit (intelligence+effort) became more effective, so that The world beholds for the first time the spectacle of a brilliant class, the fiver percent of a nation who know what 5 percent means (p. 103). The most intelligent children obtained the best education, and to insure justice for late developers, quinquennial revaluations were held at Regional Centres for Adult Education. With the intelligent taking their rightful positions of leadership, the Pioneer Corps was established to provide the least responsible jobs for the least able people and the Home Help Corps provided domestic servants again, after a lapse during the egalitarian age. Consequently, the gap between the classes became wider, with social inferiors being inferiors in other ways as well. Despite the Equalization of Income Act of 2005, tensions grew between the Technician's Party (which issued the Chelsea Manifesto in 2009, arguing for a classless and tolerant society where every human being could develop his own special capacities for leading a rich life), and the extreme conservatives who, seeing the principles of heredity and merit coming together, wished to turn full cycle and restore the hereditary principle. Despite necessary simplifications (assuming an industrial society and the dictatorship of biology over women), there is considerable insight to be had from this essay, and the format serves as an exemplary model of a future history. Recommended.

100. Hapgood, David. Diploma-Ism. New York: Pegasus, Feb. 1971. $6.95.

101. Porter, John. The Future of Upward Mobility, American Sociological Review, 33:1, Feb. 1968, pp. 5–19.

A bland discussion of the growing manpower problem for post-modern industrial societies, and the inadequate function of Western educational system relative to these needs.

F. THE KNOWLEDGE EXPLOSION

102. Fischer, John. The Stupidity Problem, Harpers, Sept. 1962. Reprinted in John Fischer, The Stupidity Problem and Other Harassments. New York: Harper & Row, 1964, pp. 71–80.

A view of the Overdeveloped Society with a permanent surplus of some kinds of workers together with a permanent shortage of other kinds. As the structure of society grows in both complexity and size, the need for able managers grows in almost geometric ration . . . we have built a society calling for a distribution of intelligence entirely different from that which God provided. Possibilities of optimizing human potential, however, are not discussed.

103. Lane, Robert E. The Decline of Politics and Ideology in a Knowledgeable Society, American Sociological Review, 31:5, Oct. 1966, pp. 649–662.

Argues that we live in a knowledgeable society, resulting in changes in policymaking procedures with an increasing application of scientific criteria. New knowledge is seen as setting up a disequilibrium or pressure which requires compensating thought and action. (In light of the events since this article's publication, one must conclude that it is either premature, or reflects an outdated naivete.)

104. Machlup, Fritz. *The Production and Distribution of Knowledge in the United States.* Princeton: Princeton University Press, 1962. 416 pp. $7.50.

A landmark volume that encyclopedically investigates the varieties of knowledge, forms of education (home, job, church, armed services, in addition to schools and colleges), research and development, the media of communication, information machines, and information services. However, all of this is for the knowledge system of economists, culminating in a calculation of the knowledge-producing occupations as a share of national income (rising from 18.5% to 26.8% in the 1950–1958 period). A proposal for school reform is made in passing—essentially, raising intellectual capacity through accelerated programs. "The way to get better-educated people in the United States is to make them learn faster, study more intensively . . ." (p. 144). It is unfortunate that Machlup does not know about education and learning, and that educational planners do not know more about Machlup.

105. U.S. House of Representatives, Committee on Science and Astronautics. *The Management of Information and Knowledge.* Washington: USGPO, 1970. 130 pp. $0.60.

Seven provocative papers prepared for the Eleventh Meeting of the Panel on Science and Technology, by Herman Kahn, Stafford Beer, Daniel J. Boorstin, Thomas F. Green, Paul Armer, Osmo A. Wiio, and George Kozmetsky. Especially see "Education as an Information System" by Kozmetsky and "Education and Schooling in Post-Industrial America: Some Directions for Policy" by Green. Recommended.

106. Sweeney, Francis S.J. (ed.). *The Knowledge Explosion: Liberation and Limitation.* New York: Farrar,. Straus & Giroux, 1966. 249 pp. 15 articles derived from the 1963 Boston University Centennial Colloquim.

107. Ong, Walter J., S.J. *Knowledge and The Future of Man: An International Symposium.* New York: Holt, Rinehart, and Winston, 1968. 276 pp.

Fifteen essays from a 1968 symposium celebrating the Sesquicentennial of St. Louis University. The two sections of the book are sub-titled The Environment of Learning and Areas of Knowledge.

108. Bruner, Jerome S. "Culture, Politics, and Pedagogy." *Saturday Review,* May 18, 1969, pp. 69–72+.

Discusses learning in the future in light of the knowledge explosion and new retrieval techniques, and argues that "there are three forms of activity that no device is ever going to be able to do as well as our brain with its 5 x 10^9 cortical connections, and I would suggest that these three represent what will be special about education for the future.

"The first is that we shall probably want to train individuals not for the performance of routine activities that can be done with great skill and precision by devices, but rather to train their individual talents for research and development . . . in the sense of problem-finding rather than problem-solving. . . . A second special requirement for education in the future is that it provide training in the performance of 'unpredictable services' . . . acts that are contingent on a response made by somebody or something to your prior act. . . . Third, what human beings can produce and no device can is art—in every form . . ." (pp. 71–72). Recommended.

G. GLOBAL PERSPECTIVES ON EDUCATION

109. Coombs, Philip H. *The World Educational Crisis: A Systems Analysis.* New York: Oxford, 1968. 241 pp. Bib., pp. 217–226.

A competent overview of international educational trends, indicating that problems of rising demand and system obsolescence are afflicting all nations in every part of the world. Although the discussion is organized around inputs and outputs, it is nevertheless highly readable, covering not only the formal system but nonformal or "periphery" education. An excellent annotated bibliography of 74 items is provided. Recommended.

110. Illich, Ivan. "Outwitting the 'Developed' Countries," *New York Review of Books,* 13: Nov. 6, 1969, pp. 20–24.

A profound and illuminating essay from the viewpoint of the Third World. "The rich nations now benevolently impose a straight-jacket of traffic jams, hospital confinements, and classrooms on the poor nations, and by international agreements call this 'development.'" (p. 20) But this merely aids the existing elites, while the proportion of the population suffering from hunger, pain, and exposure in 1969 is seen as greater than at the end of World War II. The resources are simply not available to take on the "outdated" models exported by the rich. Illich calls for "counter-research" on fundamental alternatives "distinct from most of the work done in the name of the 'year 2000'." For example, to improve health, safe water is more important than more surgical wards, and medical workers are more important than doctors. An egalitarian model is proposed for education, giving every citizen a minimum chance and therefore distributing scarce educational resources on an equal basis. Teaching adults to read is seen as a higher priority for public resources than investing in schools, with more immediate return on investment. "There is more hope of planning an institutional revolution in the Third World than among the rich." Perhaps.

111. Illich, Ivan D. *Celebration of Awareness: A Call for Institutional Revolution.* Introduction by Erich Fromm. Garden City: Doubleday, 1970. 189 pp. $5.95.

Twelve essays written over a period of years, including "The Futility of Schooling" and "School: The Sacred Cow." In the first article, even the United States is seen as too poor to provide compensatory education for the less well-off, and the case for the futility of schooling in the Third World is even more obvious. In summarizing the second essay, Illich claims that "Only if we understand the school system as the central myth-making ritual of industrial societies can we explain the deep need for it, the complex myth surrounding it, and the inextricable way in which schooling is tied into the self-image of contemporary man . . . This is a time of crisis in the institution of the school, a crisis which may mark the end of the 'age of schooling' in the Western world." (pp. 121, 123) The volume concludes with A Constitution for Cultural Revolution to cope with the central issue of our time that the rich are getting richer and the poor, poorer. The first article of the bill of rights would be "The state shall make no law with respect to an establishment of education."

112. Illich, Ivan. "Schooling: The Ritual of Progress," *New York Review of Books*, December 3, 1970, pp. 20–26.

Attacks the myths of institutionalized values, measurement of values, packaging values, self-perpetuating progress, and unending consumption. "School seems eminently suited to be the World Church of our decaying culture . . . The American university has become the final stage of the most all-encompassing initiation rite the world has ever known . . . School prepares for the alienating institutionalized of life by teaching the need to be taught. De-schooling is, therefore, at the root of any movement for human liberation."

113. Illich, Ivan. "Education Without School: How It Can Be Done," *New York Review of Books*, January 7, 1971, pp. 25–31.

Advocates reference services to educational objects, skill exchanges, peer matching, and reference services to educators at large who would be chosen by polling or consulting former clients. By choosing this thorough-going alternative, "we can depend on self-motivated learning instead of employing teachers to bribe or compel the student . . . we can provide the learner with new links to the world instead of continuing to funnel all educational programs through the teacher." (p. 25)

114. Illich, Ivan. *De-Schooling Society.* N.Y.: Harper & Row, World Perspective Series, April 1971.

Based on the two pre-publication articles above, it would appear that this may be the most important book on education in 1971 (if not the 1970's), for, in a time of revolutionary fervor, Illich points to the schooling system as the root of our problems. But rather than advocating widespread educational reform (as is presently fashionable), he offers a thoroughgoing alternative that will enhance learning and provide equality of opportunity. The argument might be seen as rewarmed Paul Goodman, but it may nevertheless be embraced by the global counterculture, and appears certain to spark widespread debate.

115. Freire, Paolo. *The Pedagogy of the Oppressed.* N.Y.: Herder & Herder, November 1970. $5.95.

A Brazilian educator's radical view that "every human being, no matter how 'ignorant' or submerged in the 'culture of silence,' is capable looking critically at the world in a dialogical encounter with others, of perceiving his personal and social reality, and of dealing critically with it."

116. Mayer, Martin. *Diploma: International Schools and University Entrance.* N.Y.: Twentieth Century Fund, 1968. 250 pp.

A thorough analysis of "a small but not trivial problem which is likely to become important in the years ahead" as we increasingly become a global society, with more international workers seeking acceptable schooling for their children, and credentials that are acceptable to universities.

117. Bereday, George Z. F. and Joseph A. Lawerys (eds.), *The Education Explosion.* The World Year Book of Education. N.Y.: Harcourt, Brace, and World, 1965. 498 pp.

34 articles on the rapidly expanding world-wide demand for education, described as "one of the most important phenomena of our age." The "explosion" refers to both knowledge and clientele.

118. Bereday, George Z. F. *Essays on World Education: The Crisis of Supply and Demand.* N.Y.: Oxford, 1969.

18 essays evaluating various aspects of the world education system and appraising the state of education in Africa, Asia, Latin America, Europe, and the U.S.

H. STATE AND NATIONAL PERSPECTIVE ON EDUCATION

119. Usdan, Michael D., David W. Minar, and Emanuel Hurwitz, Jr. *Education and State Politics: The Developing Relationship Between Elementary-Secondary and Higher Education.* N.Y.: Columbia University, Teachers College Press, 1969. 190 pp.

An excellent although preliminary attempt to analyze statewide coordination as of summer 1967, based on the experience of twelve States (California, Florida, Georgia, Illinois, Indiana, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, and Texas).

The two general findings are that in most States the interlevel relationship verges on open political conflict; yet, "state policy-makers seldom recognize the relationship as something worthy of attention. They have been content, in the general style of American politics, to take problems piece-by-piece, confronting them only when necessary and then in as small portions as possible. The point, however, is that as the pressures rise and conflict grows, the probability of problems being handled successfully on this basis declines. The financial crisis of American education requires massive, broad scale consideration." (p. 188)

"On the whole, we have been pushed toward the conclusion that interlevel coordination in education is a desirable, if not essential, step. Such coordination need not be and indeed would not be likely to be tight and neat. But without some effort to bring the forces of education together into some form of integrated structure, the ability of the states to undertake rational planning in education is bound to suffer." (p. 187) Recommended

120. Usdan, Michael D., David W. Minar, and Emanuel Hurwitz, Jr. *The Politics of Elementary-Secondary and Higher Education.* Denver: Education Commission of the States, November 1968. 32 pp. (Based on Chapters I and III of *Education and State Politics.*)

Outlines policy alternatives for improving the governance of the educational system and for improving finance systems. Under the former category, suggests a single state educational system, a single state system for grades 13 and 14, a formal coordinating board, coordinated government action, a comprehensive intergovernmental planning agency, and stimulating informal coalitions of education groups.

121. Fitzwater, C. O. *State School System Development: Patterns and Trends.* Denver: Education Commission of the States, Report No. 5, March 1968. 64 pp. $1.50.

"This study is designed to serve as a basic resource for state leadership as problems are analyzed and structural changes are proposed and discussed. Dr. Fitzwater compares state structures, discusses variations, and points up national trends. Among implications for action, the need to continue school district reorganization toward optimum efficiency and the necessity for keeping abreast of urban growth in structure and allocation of resources are stressed. The study is aimed directly at the need and desire of state decision-makers to know what is going on in other states and how other states are meeting educational problems in order to place their own problems and proposed solutions in perspective." (inside cover) Trends are discussed in local school district organization, intermediate administrative districts, and state education agencies.

122. Budig, Gene A. "Coordination in Higher Education: Past and Future." *State Government Administration*, 5:5, September–October 1970, pp. 4–7.

123. Morphet, Edgar L. and David L. Jesser (eds.). *Emerging State Responsibilities in Education*. Denver, Colo.: Improving State Leadership in Education (1362 Lincoln Street), 1970. 168 pp.

An initial publication of a new project financed under Title V of ESEA. "In this publication, the implications of recent and prospective changes in society for the emerging roles, functions and relations of state education agencies primarily concerned with the improvement of provisions and procedures needed for planning and effecting improvements in elementary and secondary education are considered in some detail. Some of the major alternatives in organization and procedures are also discussed." (p. vi) Recommended

124. Erickson, Donald A. (ed.). *Public Controls for Nonpublic Schools*. Chicago: University of Chicago Press, 1969. 242 pp.

An "initial" exploration of how nonpublic education can be both responsible and free, based on a 1967 conference on state regulation. The first two chapters deal with the issue of the Amish in Iowa. No prescriptions are made.

125. National Academy of Education. *Policy Making for American Public Schools*. Recommendations based upon Working Papers prepared by The Committee on Educational Policy of the NAE. March 1969. 31 pp. (Available free from NAE Office, 723 University Ave., Syracuse, N.Y. 13210)

Issued by a blue ribbon group of educators; advocates fewer school districts, modification of fiscal inequities, upgrading quality of local leaders, a Federal Department of Education of cabinet rank, etc.

126. Tiedt, Sidney W. *The Role of the Federal Government in Education*. New York: Oxford University Press, 1966. 243 pp., paper.

"An effort to gather into one volume a concise analysis of the historical background of the role of the federal government in education, representative arguments for an against the government's greater involvement in educational concerns, a presentation of the questions revolving around aid to private schools, and a discussion of the present and future aspects of this complex problem." (p. vii) The book provides a good overview, although apparently written for college students, and concludes with several forecasts such as federal government involvement in education continuing at a rapidly increasing rate, the formation of some type of advisory board, and expansion of the role of the Office of Education. It is recommended that a National Educational Brain Trust be formed for probing the future. (p. 209)

127. Quattlebaum, Charles A. *Federal Educational Policies, Programs and Proposals. A Survey and Handbook. Part I: Background; Issues; Relevant Considerations*. Washington: USGPO, House Document No. 398 (Printed for the use of the Committee on Education and Labor), December 1968, 167 pp. $.75.

A valuable overview of a variety of areas as follows:

—Federal policies in education, 1777–1960
—Congressional enactments concerning education and training, 1961–1966
—History, organization, and functions of USOE and NSF
—Recommendations of 17 governmental and 10 nongovernmental hoc advisory commissions, 1929–1967
—Policies advocated by 23 government bodies and 55 private organizations

Recommended

128. U.S. Department of Health, Education, and Welfare. *The Federal-State Partnership for Education.* Washington: USGPO, 1970. 182 pp. $1.50.

"The fifth annual report of the Advisory Council on State Departments of Education traces briefly the history of the state educational agencies to 1965 and examines subsequent developments to reach its conclusions on what is needed to extend that progress." (advt.)

I. MULTI-LEVEL PERSPECTIVES

129. U.S. Office of Education. *Digest of Educational Statistics.* Washington: USGPO (annual).

The basic source document for education data.

130. U.S. Office of Education. *Projections of Educational Statistics to 1978–79, 1969 Edition.* Washington: USGPO (Stock No. 1770–0140), 1970. 169 pp. $1.50.

Projections of enrollments, graduates, teachers, and expenditures (current and capital) for all levels of formal education. A basic data source.

131. U.S. Office of Education. *Education in the Seventies.* Office of Program Planning and Evaluation, Planning Paper 68–1, May 1968. 44 pp.

Projections of enrollments, staff, and expenditures to 1975 for elementary, secondary, and higher education.

132. U.S. Office of Education. *Progress of Public Education in the United States of America, 1967–1968.* FS 5.210: 10005–68–A. Washington: GPO, 1968. 50 pp.

Report of the Office of Education to the 31st International Conference on Public Education (Geneva, July 1968), sponsored by UNESCO and the International Bureau of Education. "Progress" is used in the conventional rhetorical sense; the Report does not attempt to document progress by any definition.

133. Ferriss, Abbott L. *Indicators of Trends in American Education.* N.Y.: Russell Sage Foundation, 1969. 454 pp. Bib., pp. 418–454. $5.00 paper; N.Y.: Basic Books, 1970. $5.00.

Stemming from Sheldon and Moore's *Indicators of Social Change* (Item No. 27) and the continuing interest of the Russell Sage Foundation in monitoring social change, this massive array of data (32 tables and 74 figures) serves as a foundation for analyzing enrollment, teachers, quality of education, graduates, organization and finance, eductional attainment, and the degree to which society's goals have been attained. There is also a useful biblography of about 250 items.

This effort is a step toward establishing a system of social indicators or social accounts, and "by assembling in one place of great part of the statistical evidence one may then identify the missing elements, the data needed for adequate monitorship of the system." (p. 1)

Although the scholarly rigor has proved valuable in analyzing the data and pointing to new data needs, it has also strapped this volume with a crippling conventionality that severely limits its use. The "system" of elementary, secondary and higher education is unquestionably accepted as the "world" of education, and there is not the slightest hint of a broader system of peripheral institutions, testing and research organizations, government agencies, scholarly and professional associations, and other interest groups that have a critical relevance to the core of educating institutions. Similarly, progress is measured against 13 of the goals suggested by the President's Commission on National Goals in 1960 (see Item 24), without considering that these goals might be formulated differently in 1970, not to mention 1980. Although it is important to measure outcomes against goals, scholarly rigor is in vain (and highly misleading) if yesterday's goals are chosen.

There is also a question of whose goals. In the sterile framework established here, indicators on student and teacher dissent would not be considered. Finally, the book has no summary or conclusions and is written so that only fellow statisticians might appreciate it, raising the critical question as to who should "monitor" the system.

134. Byrnes, James C. with the assistance of Michael Folk. *The Quantity of Formal Instruction in the United States.* Prepared for the U.S. Office of Education by the Educational Policy Research Center. Syracuse: EPRC, August 1970. 67 pp.

Examining the educational system as a whole, the development and maturation of a nearly universal system of secondary school instruction is considered as "the most significant event of the 20th Century in the develoment of educational institutions in the United States." Yet, the proportion of high school graduates completing a 4-year post-secondary degree stands today roughly what it was about the turn of the century. The report concludes by describing two specific alternative states for the quantity of instruction (as measured by time), which highlights two possible extremes for future policy: a continuous rise in the amount of instruction received vs. stabilization.

135. *The New York Times, Annual Education Review*, Monday, January 11, 1971, pp. 47–78.

39 brief overview articles under seven headings: reforming education, some ventures in reform, syles and values, urban education, private and parochial schools, higher education, and management and finance. The 1970 edition (coming at the turn of the decade) is more oriented toward descriptive futures, whereas the 1971 edition appears more oriented toward action, or a prescriptive future. Both are excellent overviews of contemporary thinking. Recommended.

136. *The New York Times, Annual Education Review*, January 12, 1970, pp. 49–84.

A fascinating array of about 50 short articles by leading names in all areas of education and academic disciplines that affect education. Several challenging views of the future (descriptive and prescriptive) appear amidst the rhetoric.

137. *Education for the 1970's: Renewal and Reform. Messages to the Congress by Richard Nixon, President of the United States.* Washington: USGPO, March 1970. 34 pp. $.30.

Includes the message on education reform and the message on higher education. The first message proposes The National Institute of Education and announces the establishing of a President's Commission on School Finance to study the shift from quantity to quality, future financial needs, disparities among districts and states, sources of funds for education, possible efficiencies, and nonpublic schools. The second message proposes a National Student Loan Association, a Career Education Program to start new programs in community colleges, and a National Foundation for Higher Education to support institutional excellence, innovation, and reform.

138. Eurich, Alvin C. *Reforming American Education: The Innovative Approach to Improving Our Schools and Colleges.* N.Y.: Harper & Row, 1969. 269 pp. $6.50.

"Education must be vastly improved to meet the challenges of the present and the future; the innovative approach is the most promising strategy for bringing about such improvement." (p. xiii) Taking a wide-angle view, the author discusses rigid dogmas, the necessity for bold public policies, provocative new developments, new patterns of reform at all levels, and education as a futurist enterprise.

An updated scenario (see Item No. 383), "A 21st Century View of American Higher Education" (pp. 175–199), touches on university cities, sea-grant colleges on floating ocean cities, the revival of philosophy and the humanities to deal with spiritual malaise, learning terminals with graphic tablets and multipurpose TV type displays, computerized learning, internationalization, individualization, etc. Recommended

139. Rogers, Carl R. *Freedom to Learn: A View of What Education Might Become.* Columbus, Ohio: Charles E. Merrill, Publishing Co., 1969. 358 pp.

An eminent psychologist feels that "all teachers and educators prefer to facilitate experiential and meaningful learning, rather than the nonsense syllable type. Yet in the vast majority of our schools, at all educational levels, we are locked into a traditional and conventional approach which makes significant learning improbable if not impossible . . . It is not because of any inner depravity that educators follow such a self-defeating system. It is quite literally because they do not know any feasible alternative." (p. 5) Alternatives are suggested toward building "a fully functioning person" and a plan for self-directed change in an educating system is proposed. Although the comments are directed at all levels, a special chapter is devoted to "A Revolutionary Program for Graduate Education," in that the graduate level "is frequently the furthest behind the main stream of our culture and is the least educational in any true sense." (p. 189) Recommended

140. Rogers, Carl R. "Interpersonal Relationships: USA 2000," *Journal of Applied Behavioral Sciences*, 4:3, July-September 1968, pp. 265–280.

Discusses the future of encounter groups, the shift from schools to learning environments, and the evolution of teachers to learning facilitators. An optimistic view permeates the assessment of the potentialities of interpersonal relationships, seen as more intimacy, less loneliness, and an improvement in conflict resolution and relationships between the sexes. "All of this is possible if as a people we choose to move into the new mode of living openly as a continually changing process." (p. 274) But the chances of this eventuality are not assessed.

141. Hutchins, Robert. *The Learning Society.* N.Y.: Praeger, 1968. 142 pp.: Mentor Books, 1969. 166 pp. $1.25.

Argues for making liberal education universal, in that "the more technological the society is, the more rapidly it will change and the less valuable ad hoc education will become." Predicts that "In the closing decades of the twentieth century, education seems destined to become the principal preoccupation of all states."

142. Goodman, Paul. *Compulsory Miseducation and The Community of Scholars.* N.Y.: Vintage, 1964.

A reprint of two volumes previously published separately. "Miseducation" (Horizon Press, 1964) advocates an education that is less wasteful of human resources and social wealth than the present system, while "Community" (Random House, 1962?) advocates apartment-sized colleges.

143. Richmond, W. Kenneth. *The Education Industry.* London: Methuen, 1969. 237 pp. (Distributed in U.S. by Barnes & Noble).

Argues that it is both legitimate and necessary to think of educational services in terms of an industry, and "that the systematic and controlled application of science-based knowledge and techniques can bring about a massive enlargement of human experience . . . It is the conviction that education technology is destined to emerge as *the* central humane discipline of the future." (p. 204) There is little coordination to this book, however, with rambling discussions of The Improvident Society, The New York State Quality Measurement Project, Swedish Reform, The End of Literate Man, Beyond Literacy, General Systems Theory, and Educational Planning and Educational Technology.

144. Marien, Michael. "Notes on the Education Complex as an Emerging Macro-System" in E. O. ATTINGER (ed.), *Global Systems Dynamics.* N.Y.: Wiley-Interscience, 1970, pp. 225–244. (Reprints available from Educational Policy Research Center at Syracuse.)

Although addressed to a symposium of general systems theorists, the suggestion of an emerging macro-system may provide a useful overview to educational planners. The components of the system include core institutions (elementary, secondary, and higher education), peripheral institutions, suppliers, and interest groups of professionals and clients. In addition to increasing linkage of core components, there is a relatively greater growth of the periphery (adult, corporate training programs, etc.), the emergence, nationalization, and agglomeration of suppliers, and the spread of power to new interest groups—especially those representing personnel and students.

145. Marien, Michael. "The Basic Long-Term Multifold Trend in Education," *The Futurist*, IV: 5, December 1970, pp. 220–223.

A synoptic chart of 13 general categories and several dozen trends indicates the broad shift from closed teaching systems to open learning systems. The major question is the rate of this transition: Little or no transition will lead to greater conflict, differential adaptation will lead to greater inequality of opportunity, and full adaptation will lead to generational inversion (where the young become superior to the old).

146. Borton, Terry. *Reach, Touch, and Teach: Student Concerns and Process Education.* N.Y.: McGraw-Hill, 1970. $4.95.

"Proposes an emphasis on personal feelings in educational processes, and argues that education should be seen as a means of personal growth." (*Chronicle of Higher Education*)

147. Taylor, Harold. *The World as Teacher*. N.Y.: Doubleday, 1969. 322 pp. $6.95.
The result of a two-year study of the education of American teachers in world affairs. Proposes a wide array of reforms to make education more relevant to the emerging world society. Recommended

148. Fuller, Buckminster. *Education Automation: Freeing the Scholar to Return to his Studies*. Carbondale: Southern Illinois University Press, 1962; Arcturus Books Edition, 1964. 88 pp.
A rambling, hortatory discourse presented in 1961 to the SIU Edwardsville Campus Planning Committee. Includes a forecast of education as "number one among the great world industries" and a vision of an "intercontinentally networked documentaries call-up system, operative over any home two-way TV set." (p. 48)

149. Eble, Kenneth E. *A Perfect Education*. N.Y.: Macmillan, 1966. 215 pp.
Covers play, discovery, order, thinking, knowing, doing, style, worth, excitement and response, what's worth learning, etc., for all levels of education.

150. Lifton, Walter N. (ed.). *Educating for Tomorrow: The Role of Media, Career Development, and Society*. N.Y.: Wiley, 1970. 244 pp. $8.95.

151. Roche, George Charles III. *Education in America*. Irvington-on-Hudson, N.Y.: The Foundation for Economic Education, Inc., 1969. 163 pp.
A conservative view of conditions in the schools and colleges, concerned with deterioration of modern society, collapse of standards, decline of intellect, and lack of discipline. Desiring that students learn to think for themselves, education reform is seen as beginning with parents "with the recognition that better upbringing for their children lies in their hands, not in the hands of the state." (p. 154)

152. Molnar, Thomas. *The Future of Education*. London: Fleet Press Corp., 1961; Revised Edition, 1970. $5.50.
A conservative view.

153. Peterson, A.D.C. *The Future of Education*. London: The Cresset Press, 1968; N.Y.: Humanities, May 1969. 234 pp.
In predicting future development, the author states at the outset that "education has one advantage over other social activities. It has lagged so far behind the changes in society as a whole that we already know that it at least needs considerable adaptation, before it is relevant even to the society in which we are now living." (p. 1) Although concerned with education in England, there may be considerable relevance to the U.S. as concerns the description and prescription of developments in content, methods, administration, the teaching profession, tertiary education, and financing. Recommended

154. MacArthur, Brian (ed.). *New Horizons for Education: A Symposium on the future as Britain enters its second century of state education*. London: Council for Educational Advance, 1970 (?). 111 pp.

155. Leys, Wayne A. R. and P.S.S. Rama RAO. *Gandhi and America's Educational Future: An Inquiry at Southern Illinois University*. Carbondale: SIU Press, 1969. 137 pp. $4.85.
Reflections on solutions to problems of American education based on Gandhian thought.

156. Shrimali, Kalulal L. *The Future of Basic Education*. Chandigarh: Panjab University, 1966. 63 pp.
Advocates revitalizing Indian education by promoting Gandhi's concepts. No discussion of the future.

157. Lewis, Joan. *Utopias as Alternative Futures*. Menlo Park: Educational Policy Research Center at Stanford, Research Memorandum EPRC–6747–7, March 1970. 50 pp.
Classifies utopias as Structured, Dynamic, and Transcendental societies, and infers that each group accommodates the needs of special personality types.

158. Ozman, Howard. *Utopias and Education*. Minneapolis: Burgess Publishing Co., 1970. 56 pp. $3.75 paper.
Discusses the educational ideas of Plato, Thomas More, Samuel Gott, Robert Owen, Samuel Butler, Edward Bellamy, William Morris, H. G. Wells, Aldous Huxley, B. F. Skinner, and others.

159. Ozmon, Howard. *Challenging Ideas in Education*. Minneapolis: Burgess Publishing Co., 1967. 240 pp.
Final chapter on Education and Utopia.

160. Fisher, Robert T. *Classical Utopian Theories of Education.* N.Y.: Bookman Associates, 1963. 180 pp.

Discusses the role of education in six utopian works.

161. Massó, Gildo. *Education in Utopias.* N.Y.: Columbia University, Teacher's College, Contributions to Education No. 257, 1927. 200 pp.

A scholarly review of utopian criticism of education, the place of education in utopias, and education in the home, church, school, workplace, and community.

II. Elementary and Secondary

A. GENERAL

162. American Association of School Administrators, Commission on Imperatives in Education. *Imperatives in Education.* Washington, AASA, 1966. 180 pp.

Policy statements (issued within the rigid framework of traditional concepts and rhetoric) for the reshaping of organizational patterns "to meet the needs of the times." Broad, but unsystematic; covering urban life, job training, creative talent, the moral fabric of society, psychological tensions, democracy, use of natural resources, leisure time, and international human betterment.

163. Anderson, Robert H. *Teaching in a World of Change.* N.Y.: Harcourt, Brace and World, Inc., 1966. 180 pp.

A readable, authoritative summary of recent innovations in school organization, team teaching, school design, and other matters; written for teachers but useful for a wider audience. (Philip H. Coombs).

164. Bander, Peter (ed.). *Looking Forward to the Seventies: A Blueprint for Education.* Buckinghamshire, Eng.: Colin Smythe, Ltd., 1968. 333 pp.

A British symposium of 27 distinguished contributors. Somewhat future-oriented, but hardly a "blueprint."

165. Bebell, Clifford F. S. *The Educational Program.* Denver: Designing Education for the Future: An Eight-State Project, July 1967. 59 pp.

A background monograph providing an excellent summation of the first three Designing Education for the Future conferences (Item 221), in order to stimulate further work in each of the eight praticipating states. Recommended.

166. Benson, Charles S. *The Cheerful Prospect: A Statement on the Future of American Education.* Boston: Houghton-Mifflin, 1965. 134 pp.

As a means for bringing about equality in education, suggests that all reading teachers be qualified through standardized examinations.

167. Benton, John E. (ed.) *Forward Edge in American Education. Book I: The New System.* Tempe, Arizona: National Center for Educational Innovation, 1968. 255 pp.

19 articles, including "Foundations of the New System" by W. W. Harmon, Director of Stanford EPRC. Other volumes in this teacher oriented series to follow.

168. Blishen, Edward (ed.). *The School That I'd Like.* Middlesex, England: Penguin Books, 1969. 171 pp.

A charming collection of astute comments by English children, ages 11–18, based on a competition conducted by *The Observer* in December 1967. Blishen concludes that:

"Standing out above everything else is the children's desire to teach themselves, rather than to be the passive targets of teaching: a great restlessness about classrooms, timetables, the immemorial and so often inert routine of schools. The children seem to sense what their elders are slow to sense, that you enter the world of the late twentieth century ill-armed if all you have done is to submit, to some degree or other, to a pre-determined, pinched, examination-harried course of instruction, from which in its nature most of the excitement and surprise of learning is excluded . . ."

"The evidence of all this writing is that our children are immensely anxious to be reasonable, to take account of practical difficulties. Some of these entries were dullish or dulled, but there was very little in them that was foolish. I can't imagine any educationist anxious to learn from what the children say who would not emerge from this book with his head full of perfectly firm and very sensible ideas." (pp. 13–14)

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Quite so, and one would hope to see many American counterparts of this volume, to supplement critiques provided in underground newspapers. Recommended

169. Brameld, Theodore. *The Climactic Decades: Mandate to Education.* Foreword by Kenneth D. Benne. N.Y.: Praeger, 1970.

An overview of the American educational systems, with suggestions for overcoming defects.

170. Brameld, Theodore. *Education for an Emerging Age: Newer Ends and Stronger Means.* N.Y.: Harper, 1961. 244 pp.

171. Brickman, William W. (ed.). *Educational Imperatives in a Changing Culture.* Philadelphia: University of Pennsylvania Press, 1967. 232 pp.

172. Campbell, Roald F., and Robert A. Bunnell. *Nationalizing Influences on Secondary Education.* Chicago: University of Chicago, Midwest Administration Center, 1963. 128 pp.

173. Clark, Kenneth B. "Alternative Public School Systems," *Harvard Educational Review*, 38:1, Winter, 1968, pp. 100-113.

Because of problems in present ghetto education Clark contends that it will be necessary to find "realistic, aggressive, and viable competitors" to the present public schools, such as regional state schools, federal regional schools, college and university-related open schools, industrial demonstration schools, labor union sponsored schools, and army schools.

174. Coleman, James S. "Toward Open Schools," *The Public Interest*, No. 9, Fall 1967, pp. 20-27.

The author of the well-known "Coleman Report" on Equality of Educational Opportunity advocates discarding the idea of the school as a closed institution and thinking of it as a base of operations. Opening the school is facilitated through released time, private contractors, payment by results, free choice for the consumer, and an intensified program of interscholastic activities.

175. Committee for Economic Development. *Innovation in Education: New Directions for the American School.* N.Y.: CED (477 Madison Ave.), July 1968. 75 pp. $1.00.

An authoritative statement on problems of American schools, goals, opportunities, costs, and benefits, concluding with a proposal for a Commission on Research, Innovation, and Evaluation in Education.

176. Committee for Economic Development. *The Schools and the Challenge of Innovation.* Supplementary Paper No. 28. N.Y.: CED, January 1969. 341 pp. $7.95; $4.00 paper.

13 background papers to the above volume, covering finance, evaluation and research, teachers, and instructional systems.

177. Conant, James B. *The American High School Today: A First Report to Interested Citizens.* N.Y.: McGraw-Hill, 1959; Signet Books, 1964. 141 pp. $.60.

A well-known establishmentarian study concerned with the comprehensive high school in school districts of 30.000 to 100.000 inhabitants, and concluding with 21 recommendations on matters such as counseling, individualized programs, required programs, ability grouping, English composition, slow readers, the academically talented, organizing the school day, summer school, foreign languages, homerooms, science courses, social studies etc.

178. Conant, James Bryant. *The Child, the Parent, and the State.* N.Y.: McGraw-Hill, 1959; paper edition, 1965. 211 pp. $1.95.

Four lectures on secondary education discussing the governmental framework within which schools are operated, financial difficulties in light of cold war challenges, the necessity for the entire citizenry to be awakened to the need for "radical reform" (tame in the light of today's awareness), and "The Revolutionary Transformation of the American High School" to a comprehensive institution serving nearly all youth. Concludes with a prophecy that: "If the free world survives the perils that now confront it, I believe historians in the years 2059 will regard the American experiment in democracy as a great and successful adventure of the human race . . . They will regard the American high school, as it was perfected by the end of the twentieth century, not only as one of the finest products of democracy, but as a continuing insurance for the preservation of the vitality of a society of free men." (p. 103) Needless to say, this forecast sounds other-worldly twelve years later.

179. Culbertson, Jack (ed.). "Education and Public Policy Symposium," *Public Administration Review*, XXX:4, July-August 1970, pp. 331–375.

Seven important articles as follows: "Educational Governance and Policy-Making in Large Cities" (Luvern L. Cunningham), "Low-Income Families and the Schools for their Children" (Theodore R. Sizer), "Federal Influences on Educational Policy" (Roald F. Campbell), "New Relationships Between Education and Industry" (Francis Keppel), "The State and Educational Policy" (Lawrence D. Haskew), "Changing Nature of the School Superintendency" (Sidney P. Marland, Jr.), and "The Financing of Elementary and Secondary Education" (H. Thomas James). Recommended.

180. de Grazia, Alfred and David A. Sohn (eds.). *Revolution in Teaching: New Theory, Technology, and Curricula*. N.Y.: Bantam Matrix Editions, 1964. 310 pp. $.95.

30 contributions on hopes and happenings in curriculum and uses of technology. A worthwhile collection, although perhaps outdated and overly enthusiastic in its titling.

181. Dexter, Lewis A.: *The Tyranny of Schooling. An Inquiry into the Problem of "Stupidity,"* N.Y.: Basic Books, 1964. 182 pp.

Attacks the negative aspects of compulsory education and the vast overemphasis on schooling and intellectual achievement in our society.

182. Douglass, Harl R. *Trends and Issues in Secondary Education*. Washington, D.C.: The Center for Applied Research in Education, Inc., 1962. 101 pp.

A compact listing of a wide array of trends. Noncritical, little supporting data, and nine years old, but nevertheless an interesting overview of many fine details.

183. *Education Now for Tomorrow's World*. Report of the California Association of Secondary School Administrators' Curriculum Committee, Subcommittee on Curriculum Objectives, 1970 to 2000. May 1968. 62 pp.

184. Elam, Stanley and William P. McClure (eds.). *Educational Requirements for the 1970's: An Interdisciplinary Approach*. N.Y.: Praeger (Published for Phi Beta Kappa), 1967. 266 pp.

Seven articles plus panel discussion, largely covering educational adjustments to new economic realities.

185. Eurich, Alvin C. and the Staff of the Academy for Educational Development (eds.). *High School 1980: The Shape of the Future in American Secondary Education*, N.Y.: Pitman Publishing Corp., 1970, 304 pp. $8.50.

Articles on the reformed curriculum in English, social studies, science, foreign languages, and vocational education, in addition to views of the future of school buildings, guidance and testing, the school without walls, relevance, etc., Recommended.

186. Footlick, Jerrold K. *Education: A New Era*. Silver Spring, Md.: The National Observer, Newsbook, 1968 (?). 176 pp. $2.00.

A popular overview of new trends and issues, with many photographs. But where is the "New Era"? (See item 188)

187. Gattegno, Caleb. *What We Owe Our Children: The Subordination of Teaching to Learning*. N.Y.: Outerbridge and Dienstfrey, 1970, 118 p.

188. Goodland, John I., M. Frances Klein, and Associates. *Behind the Classroom Door*. Worthington, Ohio: Charles A. Jones Publishing Co., 1970. 116 pp. $2.75, paper.

Based on the organizational, curricular, and instructional thrusts which have been widely recommended and which one "might reasonably expect to be substantially implemented," the authors studied 150 classrooms in 67 schools and found that all of the changes recommended over the past 15 years "were blunted on school and classroom door." They also found a universal sameness, "a considerable discrepancy between teachers' perceptions of their own innovative behavior and the perceptions of observers," supplementary and enrichment activities differing little from regular activities, nonidentified goals in the classroom and the school as a whole, and school personnel appearing to be very much alone in their endeavors.

"Perhaps the most telling observation about our educational system is that there is not, below the level of intense criticism and endless recommendations for improvement, any effective structure by means of which countervailing ideas and models may be pumped in and developed to the point of becoming real alternatives. Stated conversely, the system is geared to self-preservation, not to self-renewal." (p. 99)

The three critical entry points recommended for the "reconstruction of schooling" pertain to the initial pedagogical skills developed in future teachers, on-the-job updating of these skills, and the continuous reconstruction of schooling to meet the changing conditions of communities and of society in general. Considering the non-adaptiveness of the school, however, it is surprising that the authors are not driven to recommend far more radical alternatives entailing new and competitive institutions. The volume is valuable, however, for its reminder of the continuing—if not widening—gap between ideal and reality. Recommended.

189. Goodlad, John I. "The Schools *vs.* Education," ***Saturday Review***, April 19, 1969.

A critique, based on many classroom visits, of the lack of progress in the past ten years. "Popular innovations of the decade—nongrading, team teaching, "discovery" learning, and programed instruction—were talked about by teachers and principals alike but were rarely in evidence." This well-known educator concludes that "The schools are conspicuously ill-suited to the needs of at least 30 percent of their present clientele." (p. 61) Recommended as a short, no-nonsense overview of the state of elementary and secondary education in America.

190. Goodlad, John I. *The Future of Learning and Teaching.* An Occasional Paper of The Center for the Study of Instruction. Washington: National Education Association, 1968. 24 pp.

Address at 1967 inauguration ceremonies of Sam Lambert as NEA Executive Secretary. Discusses impact of computer on schools and informal education, the need for "human-based schools" and a humanistic curriculum. By the year 2000, "School, as we now know it, will have been replaced by a diffused learning environment involving homes, parks, public buildings, museums, and an array of guidance and programing centers." (p. 22) Teachers are warned that if they do not legitimize the computer, the profession will be bypassed. Recommended.

191. Goodlad, John I. (ed.) *The Changing American School.* Sixty-Fifth Yearbook of the National Society for the Study of Education, Part III. Chicago: University of Chicago, 1966. 319 pp.

192. Goodlad, John I. and Robert A. Anderson. *The Nongraded Elementary School.* N.Y.: Harcourt, Brace & World, 1959; revised edition 1963. 248 pp. Bib., pp. 227–244.

A thorough exposition of an alternative pattern of school organization that "provides for the continuous, unbroken, upward progression of all pupils." (p. 219) Bibliography of about 350 items.

193. Glasser, William, M.D. ***Schools Without Failure.*** N.Y.: Harper & Row, 1969. 235 pp. $4.95.

A psychiatrist sees the schools as largely failure-oriented which is "the most impractical result of education." By failing to satisfy the basic needs of love and attaining self-worth, the author estimates, from his experience in the central city of Los Angeles, "that 75 percent of the children do not achieve a satisfactory elementary education." Parents do not complain because "they cannot compare their children's failure with a successful school experience of their own . . ." (p. 113)

Based on the principles of his previous book, ***Reality Therapy***, Glasser makes many suggestions that he has employed successfully: class meetings, reasonable rules, student conversations with adults, inviting graduates back to talk with students, abolishing grading, giving recognition to students with bad records when they start to do well, and using failing students to tutor younger failing students. Although oriented primarily toward elementary education because it is considered most important, the ideas in the book are applicable to all levels. Especially see chapter 5 on Relevance, the attack on Fact and Memory Education in chapter 6, and chapter 13 on Morality (or the need to learn and experience the value of truthfulness, which is often discouraged by schools). A simply-written, sensitive, and gentle book encouraging profound and humane reform without lapsing into ear-splitting rhetoric. Recommended.

194. Green, Thomas F. *Work, Leisure, and the American Schools*. N.Y.: Random House, Studies in Education, 1968. 174 pp. $2.25 paper.

A philosopher's discussion of work and labor, time and leisure, work and job, and the quest for potency. "The guiding consideration has been the fact that the way we think about work, jobs, vocations, leisure, and time—in short, the ideology of work—is of central importance in the process of education. Indeed, it might not be too much to say that the way we think about work may well be the most significant factor in all that we do in the matter of schools and schooling . . . What I wish to argue is roughly that, unless some current trends in the structure and culture of American schools are reversed or strongly modified, we may find ourselves approaching a leisure society with a system of education that has been increasingly directed toward preparation for a job-oriented society." (pp. 147–148)

195. Gross, Ronald and Judith Murphy (eds.). *The Revolution in the Schools*. N.Y.: Harcourt, Brace & World, 1964. 250 pp.

Fifteen reprints of the "most promising experimental ideas in American education today . . . (with) the conviction, based on direct experience, that America's schools can improve dramatically in the years ahead." (iii) Leading educators discuss television, computers, team teaching, the non-graded school, the new schoolhouse, creativity, curricula, etc., with the school of the future given a brief description. (pp. 4–6) But where is the "revolution"? Interestingly, Gross' latest anthology is titled *Radical School Reform* (see below).

196. Gross, Ronald and Beatrice (eds.). *Radical School Reform*. N.Y.: Simon and Schuster, 1969. 350 pp. $7.95.

A wide-ranging anthology of 23 articles. "Radical means going to the root, posing the fundamental problems, and responding with theories and practices which are genuine alternatives to present theory and practice . . . radical means unorthodox ways of promoting learning that fall outside the scope of conventional or even innovative school practice. This book reflects the entire range of radical thought and practice, from the grand demand that compulsory public education be repealed and the formal educational system dismantled to reports of intensely practical teachers working constructively within the existing situation but nevertheless using truly unorthodox teaching techniques." (p. 14) Recommended.

197. Guggenheim, Fred and Corinne L. Guggenheim (eds.). *New Frontiers in Education*. N.Y.: Grune and Stratton, Inc., 1966. 310 pp.

Eighteen articles on new curricula concepts, new concepts in school organizations, and new media of instruction. Claims to describe "the new frontiers of education in all its dimensions."

198. Harris, Seymour E. (ed.). *Education and Public Policy*. Berkeley: McCutcheon Publishing Co., 1965. 347 pp.

The result of a 1962–63 Harvard seminar. Papers and discussion on school control, religious issues, student aid, educational planning, educational research, accreditation, admissions, productivity, manpower, education and economic productivity, and government-education relationships. Although a few policy suggestions are sprinkled throughout, the volume is primarily useful for the questions it raises.

199. Harris, Seymour E. *Challenge and Change in American Education*. Berkeley: McCutchan, 1965.

200. Hart, Leslie A. *The Classroom Disaster: How the Outworn Classroom System Cripples Our Schools and Cheats Our Children, and How to Replace it*. N.Y.: Columbia University, Teacher's College Press, 1969. 354 pp.

201. Heise, B. W. (ed.). *New Horizons for Canada's Children*. First Canadian Conference on Children, Ste. Adele and Ste. Marquerite, Quebec, 1960. Toronto: University of Toronto Press, 1961. 199 pp.

202. King, M. R. (ed.) *Roads to Maturity*. 2nd Canadian Conference on Children, Montreal, 1965. Toronto: University of Toronto Press, 1967.

203. Holt, John. *How Children Fail*, N.Y.: Pitman Publishing Corp., 1964. 181 pp.

It is contended that adults destroy most of the intellectual and creative capacity of children. They "encourage children to act stupidly, not only by scaring and confusing them, but by boring them . . ." (p. 169) The alternative to the present style of education (or non-education) "is to have schools and classrooms in which each child in his own way can satisfy his curiosity, develop his abilities and talents, pursue his interests . . ." (p. 180)

204. Holt, John. *What Do I Do Monday?* New York: E. P. Dutton & Co., 1970. 318 pp. $6.95.

The latest book by a well-known critic, designed for teachers, parents, children, and friends of children.

205. Holt, John. *The Underachieving School*. New York: Pitman, 1969. $4.95. Delta Paperback, 1970. 208 pp. $2.25.

206. Hunnicutt, Clarence W. (ed.). *Education 2000 A.D.* Syracuse: Syracuse University Press, 1956, 321 pp.

18 addresses commemorating the 50th anniversary of the Syracuse University School of Education, each purportedly considering "the present status and probable directions of elementary education in our country." Unfortunately, nearly all of the papers are simplistic rhetoric, with "2000 A.D." merely utilized as an invitation to prescribe, often in incredibly minute areas. The volume serves, however, as an example of the future as a rhetorical device (e.g., Francis Keppel, "Universities and Educational Leaders—The Next Fifty Years"), conceived in an age of relatively unabated optimism.

207. Itzkoff, Seymour W. *Cultural Pluralism and American Education*. Scranton, Pa.: International Textbook Co., 1969. 202 pp.

A ponderous essay on the social and philosophical foundations of education, with the final chapter outlining "A Strategy for Change" by discussing dialectical trends, the nemesis of population, student rights, local control, and private education. Concludes that "Ultimately man will have to face intellectually the issues of equality, universality, and plurality" (p. 196), and several comments are offered on the pluralism of tomorrow that "will present choice of a variety never before thought possible."

208. Jencks, Christopher. "Is the Public School Obsolete?" *The Public Interest*, No. 2, Winter 1966, pp. 18–27.

Several possibilities discussed to "liberate the schools from the dead hand of central administration."

209. Joyce, Bruce R. *The Teacher and His Staff: Man, Media, and Machines*. Washington: National Education Association, Center for the Study of Instruction and National Commission on Teacher Education and Professional Standards, May 1967. 28 pp.

A description of the school of tomorrow, where there will be "a new and more responsible role for the competent and imaginative teacher and interesting ways to orchestrate his resources." (NEA brochure.)

210. Joyce, Bruce A. *Alternate Models of Elementary Education*. Waltham, Mass.: Blaisdell Publishing Co., August 1969.

211. Kemelman, Harry. *Common Sense in Education*. New York: Crown, 1970. $5.95.

The author of *Friday the Rabbi Slept Late* provides "a warm and penetrating analysis of the faults and the problems of today's schools, with practical suggestions for improving the quality of education . . . that will put 'education' back as the top priority for schools, and values back into the curriculum." (advt.)

212. Kimball, Solon T. and James E. McClellan, Jr. *Education and the New America*. New York: Random House, 1962; Vintage Edition, 1966. 402 pp.

"Bringing into contemporary focus the traditional message of the professional educationist, namely that the schools must change to meet the demands of a changing society." Prescriptions are summarized in Chapter 13, "Eductaion for Commitment."

213. Kohl, Herbert R. *The Open Classroom: A Practical Guide to a New Way of Teaching*. New York: New York Review/Vintage, 1969, 116 pp. $1.65.

"This book is a handbook for teachers who want to work in an open environment . . . It is important not to equate an open classroom with a 'permissive' environment." (p. 15) Kohl explains alternatives to textbooks and the domination of the teacher, learning from the experience of the students, establishing rules and routines only as necessary for a particular class, discipline, how a teacher can survive in an oppressive bureaucracy while maintaining an open and exciting classroom and treating students as people. It is contended that these principles of non-authoritarian education are applicable to all fields of learning. Recommended.

214. Kraft, Ivor. "The Coming Crisis in Secondary Education," *The Bulletin of the National Association of Secondary School Principals*, 49:298, February 1965, pp. 5–42.

The entire issue is focused on this trenchant article, which contends that the coming crisis will be fully upon us by 1975. The three components of the crisis involve the incompetence and timidity of educators, administrators, school boards, and policy makers, leaving secondary education leaderless and aimless; the polarization of schools into services for largely college oriented youth and services for lower class youth; and the content and subject matter of education or the discrepancy in relating the learner to what is to be learned. The remainder of the issue is devoted to 14 respondents.

215. Leonard, George B. *Education and Ecstasy.* New York: Delacorte Press, 1968. 239 pp.

A journalistic description of how conventional classrooms inhibit learning. The proposed alternative, which utilizes presently available technology, centers on a "total environment" concept: "It is only when the learning environment is viewed and acted upon as a whole that education can become truly efficient and joyful." (p. 182) Includes a scenario, "Visiting Day, 2001 A.D." of a grade school where children are "free learners," coming and going as they please, and partaking of a variety of electronic learning aids.

216. Lerner, Max. *Education and a Radical Humanism: Notes Toward a Theory of the Educational Crisis.* The Kappa Delta Pi Lecture Series. Columbus: Ohio State University Press, 1962. 63 pp. $2.50.

"The American educational system . . . must present the nature and operation of the harsh realities of the contemporary world." Proposes a program of creative education based on individual excellence and a sense of human dignity, and an ethos based on a "radical humanism" that "makes the richness, variety, and fulfillment of human life the test of thought and action and passion, and makes man the basis of society . . ." (book jacket)

217. Linelerry, William P. (ed). *New Trends in the Schools. The Reference Shelf*, 39:2. New York: H. W. Wilson Co., 1967. 211 pp.

20 popular reprint articles covering the impact of the federal government, new programs and methods, et cetera. Superficial and of little value.

218. McClellan, James E. *Toward an Effective Critique of American Education.* Philadelphia: Lippincott, 1968. 324 pp.

An analysis of five contemporary writers with the following chapter headings: 1) The System, The Establishment, and The Search for a New Politics, 2) James Bryant Conant: A Man-Made System and Vice-Versa. 3) Theodore Brameld and the Architecture of Confusion, 4) Jacques Barzun: Is It Enough to Be an Anti-Anti-Intellectual?, 5) B. F. Skinner's Philosophy of Human Nature: A Sympathetic Criticism, 6) Paul Goodman: A Systematic Thinker Fights the System, 7) Where is the Polity?

219. McLuhan, Marshall and George B. Leonard. The Future of Education: The Class of 1989, *Look*, 31: 4, Feb. 21, 1967, pp. 23–25.

A short and provocative forecast of education by two leading thinkers. Mass education is seen as a child of the mechanical age, and with the advent of new technologies, "the very first casualty of the present-day school system may very well be the business of teacher-led instruction as we now know it." The new education "will be more concerned with training the senses and perceptions than with stuffing brains . . . The new student who makes his own educational space, his own curriculum and even develops many of his own learning methods will be unique, irreplaceable." Recommended.

220. Montgomery County (Md.) Student Alliance. A Study Report of the Montgomery County Public School System. Wanted: A Humane Education. An Urgent Call for Reconciliation Between Rhetoric and Reality," in Diane DIVOKY (ed.), *How Old Will You Be in 1984? Expressions of Student Outrage From the High School Free Press.* N.Y.: Discus Avon, 1969. $1.25 paper.

The 250 selections from the underground press in the Divoky volume are of some interest, but the Study Report (pp. 329–350) is extremely well done and compares favorably (in its maturity and insight) with many if not all of the other "adult" reports cited here. The county public schools are attacked for basing the system on fear, dishonesty, destruction of eagerness to learn, causing alienation, demanding blind obedience to authority, stifling self-expression, narrow scope of ideas, prejudice, and instilling self-hate. "The extent to which school officials appear unaware or unconcerned about how students feel and the effects of the schools is frightening and disturbing." (p. 334). Twenty-four recommendations are made, including an ombudsman, an end to secret files, student input in teacher evaluations, eliminating letter grades, a free press, shorter and more flexible learning modules, relevant courses, informing students of their rights, a student voice on the school board, etc. Recommended.

221. Morphet, Edgar L. and others (eds.). *Designing Education for the Future: An Eight State Project*. 7 volumes, 1966–1969.

A massive project involving the eight mountain states and headquartered in Denver. Although the seven volumes, final report, and five sound filmstrips that resulted tend to be rather conventional, leaving one with the impression of blind men somewhat better informed about their elephant of inquiry, there are nevertheless some valuable contributions here, and the ambitious structuring of the entire project is to be especially commended. Most of the following are published by Citation Press, with Morphet and Charles O. Ryan as co-editors of the first three, and Morphet and David L. Jesser as co-editors of the remainder.

Vol 1. *Prospective Changes in Society by 1980*. N.Y.: Citation, 1967. 268 pp. (16 articles by non-educators.)

Vol. 2. *Implications for Education of Prospective Changes in Society*. N.Y.: Citation, 1967. 323 pp. (20 articles, largely by professional educators, in response to Vol. 1.)

Vol. 3. *Planning and Effecting Needed Changes in Education*. N.Y.: Citation, 1967. 317 pp. (26 articles, largely by professional educators, on planning for and effecting change in schools, school customs, metropolitan areas, and at the state level.)

Vol. 4. *Cooperative Planning for Education in 1980: Objectives, Procedures, and Priorities*. N.Y.: Citation, 1968. 105 pp. (Four worthwhile articles concerned with prospective social change and the implications for educational planning.)

Vol. 5. *Emerging Designs for Education*. Denver: Designing Education for the Future, May 1968. 240 pp. (Four articles on implications of societal changes for the educational program, alternative local school district models, and alternative models for state financing.)

Vol. 6. *Planning for Effective Utilization of Technology in Education*. Denver: Designing Education for the Future, August 1968. 372 pp. (32 articles, many of them from representatives of potential supplying organizations.)

Vol. 7. *Preparing Educators to Meet Emerging Needs*. Denver: Designing Education for the Future, 1969.

222. Morse, Arthur D. *Schools of Tomorrow—TODAY!* Albany: University of the State of New York, State Education Department, 1960. 191 pp.

Nine case studies representing "a cross-section of experimentation" which promises to lift the level of American education via team teaching, classroom aides, non-graded schools, television, etc.

223. Musgrave, G. Ray. *The Grading Game*. N.Y.: Vantage Press, 1970. "Asks that we change the current basis of grading public school pupils to salvage U.S. education." (adut.)

224. Neill, A. S. *Summerhill: A Radical Approach to Child Rearing*. With a Foreword by Erich Fromm. New York: Hart Publishing Co., 1960. 392 pp. $1.95 paper.

The founder of the world-famous Summerhill school, started in 1921 in Suffolk, England, discusses his school, child rearing, sex, religion and morals, children's problems, parents' problems, and various questions that have been asked of him over the years. Perhaps needless to say, the school is established on the principles of freedom and nonrepression, with discipline self-imposed by the pupils.

225. *Summerhill: For and Against*. New York: Hart Publishing Co., 1970. 271 pp. $1.95 paper.

Fifteen critiques, purporting to cover the spectrum of present-day thinking on education, including the comments of John Culkin, Erich Fromm, Paul Goodman, Fred Hechinger, John Holt, Ashley Montagu, Max Rafferty, etc.

226. Nesbitt, Marion. *A Public School for Tomorrow*. New York: Delta Books, 1969 (?). $1.95 paper.

"Traces the day-to-day activities of the renowned Maury School in Richmond, Va., a public school that exemplifies learning integrated with daily living, creating and environment where every child can grow toward self-realization."

227. Dennison, George. *The Lives of Children: The Story of the First St. School.* New York: Random House, 1969. 308 pp.

Concerns a mini-school of 23 pupils and four teachers in NYC lower east side, short-lived due to funding problems. Shows what can be done in open schooling—and what isn't being done.

228. Sudbury Valley School. *The Crisis in American Education: An Analysis and A Proposal.* Framingham, Mass.: The Sudbury Valley School Press (Winch Street), 1970. 109 pp. $150.

"This book presents the action and thought which brought forth The Sudbury Valley School, and will bring forth other schools like it throughout the country." A bold new solution is proposed to overcome "Our Un-American Schools: . . . for education in America today, the grand strategy must be to make the schools the embodiment of the American Dream for young and old alike—to make the schools of Individual Rights, Political Democracy, and Equal Opportunity for all people and for all time." (p. 45). The Sudbury Valley School opened in July 1968 as a day school for students aged four years and up . . . " a prototype democratic school for all to see and to study." The second step in the tactic of change is to establish satellite public schools, culminating finally in public schools with public support. Recommended.

229. Featherstone, Joseph. "Schools for Children: What's Happening in British Classrooms. *The New Republic*, Aug. 19, 1967; "How Children Learn," *The New Republic*, Sept. 2, 1967; "Teaching Children to Think," *The New Republic*, Sept. 9, 1967.

An important series that introduced the British experience with "informal schooling" to the United States. Also see, Charles E. Silberman, *Crisis in the Classroom* (Item 243), who devotes a long chapter (pp. 207–264) to "The Case of the New English Primary Schools" as a model for how the schools should be changed.

230. Postman, Neil. "Once Upon a Time—A Fable of Student Power," *The New York Times Magazine*, June 14, 1970, pp. 10–11.

Although brief, this delightful scenario describes a very clear alternative to schooling that was put into effect during an officially declared state of emergency in New York City. The Emergency Education Committee developed a curriculum for all children in the 7th–12th grades, known as Operation Survival, obliging them to clean up neighborhoods, beautify the city, direct traffic (freeing the police to fight crime), deliver mail, maintain day-care centers, tutor elementary school students, publish neighborhood newspapers, assist in hospitals, register voters, substitute for certain adults whose jobs the students could perform without injury or loss of efficiency (thus freeing the adults to attend school or assist students in saving the city) and, with the aid of college students, conducting an auxiliary public transportation system (thereby reducing auto traffic). Consequently, young people assumed a proprietary interest in their environment and came to be respected by the old, leading to a revival of courtesy and a decrease in crime. "Amazingly, most of the students found that while they did not 'receive' an education, they were able to create a quite adequate one." Difficulties developed, however, from teachers who felt their training to be wasted, and the inability to tell dumb children from smart children due to the cessation of testing. "But the Mayor . . . promised that as soon as the emergency was over everything would be restored to normal. Meanwhile, everybody lived happily ever after—in a state of emergency, but quite able to cope with it." Recommended.

231. Postman, Neil and Charles Weingartner. *Teaching as a Subversive Activity.* N.Y.: Delacorte, 1969. 219 pp. $5.95.

Perhaps intentionally, the title of this loosely organized book is ambiguous, for the aims of transmitting dead ideas, values, metaphors, and information, and creating smoothly functioning bureaucrats are truly subversive since they undermine our chances of surviving as a viable, democratic society (p. 15). But the authors advocate the subversion of these attitudes, beliefs, and assumptions that foster our many social problems. Based on the ideas of McLuhan, Wiener, Goodman, Gardner, Watson, Rogers, Sapir, Whorf, and Korzybski, the "inquiry method" is recommended (with the "reality curriculum" and "games curriculum" as alternatives), so that "all students develop built-in shockproof crap detectors as basic equipment in their survival kits." (p. 218) Many other ideas are offered—such as abolishing textbooks, courses, and grades—and some may appear overly romantic, such as reproducing graffiti for the school halls as feedback to the slogans of administrators. But are these reforms subversive or countersubversive?

232. Parker, Don. H. *Schooling for What? Sex, Money, War, Peace.* N.Y.: McGraw–Hill, 1970.

233. Powledge, Fred. *To Change a Child: A Report on the Institute for Developmental Studies.* N.Y.: Quadrangle, 1968. 117 pp. $5.50.

"An in-depth portrait of a program for a basic rearrangement of education, including massive intervention by society into the early life of a slum child." (advt.)

234. President's National Advisory Commission on Rural Poverty. *The People Left Behind.* Washington: GPO, September 1967. 160 pp.

Chapter 5 lists 33 recommendations for changing educating systems so that rural citizens may be better equipped to participate in the modern world.

235. Rafferty, Max. *Classroom Countdown: Education at the Crossroads.* N.Y.: Hawthorn Books, 1970. $5.95.

Citizen concern and common sense advocated "for every one of today's educational crises—from the morality gap and hippie invasion to pot and integration" in order to "save our most important possession, our children."

236. Rafferty, Max. *Suffer, Little Children.* N.Y.: Devon-Adair, 1962. 166 pp.

Ringing rhetoric from the widely-known conservative ex-California educator, premised on education's duty "to make possible the survival of our country." The one great problem in American education is seen as "the tragedy of declining standards." (p. 32). After attacking the "Progressive Blight," "The Cult of the Slob," "The Philistines," conformity and other fancied and real targets, it is announced that "Within the last year or two, we have witnessed the beginning of the Conservative Revolution in education." (p. 154) Rafferty appears to be the only witness to this event.

237. Repo, Satu (ed.). *This Book Is About Schools.* Introduction by Herbert Kohl. (N.Y.): Pantheon, 1970. 457 pp. $7.95.

26 articles from *This Magazine Is About Schools:* "a mixed bag of diverting criticisms, practical visions, and handy guerilla tactics for teachers, students, and parents." (cover).

238. Robinson, Thorington P. *The Implication of Selected Educational Trends for Future School Systems.* Santa Monica: System Development Corporation, January 1968. SP–3046. 94 pp.

An extrapolation of two major trends: 1. The trend toward the assumption by the schools of tasks and responsibilities previously undertaken by the family, other public agencies, and industry; and 2. The trend toward providing individualized education to all school students. Based on these trends, two skillfully constructed and plausible scenarios are presented.

239. Rollins, Sidney P. *Developing Nongraded Schools.* Itasca, Illinois: Peacock, 1969. 269 pp.

"Pleads for a child-centered curriculum, a technologically augmented teacher force, and an architecture pertinent to individual differences and intellectual flexibility . . . envisions a twenty-first century utopian, computer-assisted, machine-recorded school system." (*Saturday Review*, April 19, 1969, p. 72.)

240. Schrag, Peter. *Voices in the Classroom: Public Schools and Public Attitudes.* Boston: Beacon Press, 1965. 292 pp.

Portraits of schools in ten American communities, ranging from Newton, Mass. (where education is the "basic industry") to Perry County, Ky., Macon, Ga., and Chicago. A concluding chapter advocates "the 'open school'—an institution receptive to ideas and suggestions from all sources and prepared to expand its horizons to cope with the social and economic problems which affect education in the classroom." (book jacket)

241. Searles, John E. *A System for Instruction.* Scranton, Pa.: International Textbook Co., 1967. 170 pp.

"This volume is written for those who will be practicing instruction in the new world of the 1970's and beyond." (p. 3) Author makes a feeble attempt to address his textbook to "The World of the Twenty-First Century" (pp. 10–14) and provides a scenario of "The Classroom of the Year 2000" (pp. 15–18). Although ignorant of future literature, this is at least an attempt to address a narrow but important concern to a changing world.

242. Shane, Harold G. "Future Shock and the Curriculum," *Phi Delta Kappan*, October 1967, pp. 67–70.

An educator's prescriptions for facing the future: in-service training programs, lifetime curricula, comprehensive self-realization centers, reversing emphasis on upper levels of education, annexing content from other fields, etc. Brief, readable, and perhaps a good focus for discussion.

243. Silberman, Charles E. *Crisis in the Classroom: The Remaking of American Education.* N.Y.: Random House, Fall 1970. 525 pp. $10.00.

Based on a three and one-half year study commissioned by the Carnegie Corporation, this broad indictment of all levels of education is based on a thorough review of the literature, extensive interviews and correspondence with educators and critics, and first-hand investigation in more than 100 schools by the author and in about 150 more schools by his three-member staff.

Silberman finds the schools to be "intolerable," severely afflicted by "mindlessness," operating on the assumption of distrust, offering a banal and trivial curriculum, and preoccupied with order and control (which in turn creates discipline problems, rather than eliminating them). More than 200 examples of school pracitce are provided in support of these charges, which are no less severe than those made by the so-called "romantic" critics of the past decade.

Based on an analysis of the superiority of English primary schools, "informal education" (also known as free schools, open learning systems, etc.) is strongly advocated. Recommended.

244. Sherman, Vivian S. *Two Contrasting Educational Models: Applications and Policy Implications.* Menlo Park, Calif.: Educational Policy Research Center at Stanford. Research Memorandum EPRC–6747–9, September 1970. 138 pp.

An extensive analysis of structured or closed systems vs. open systems, with extensive documentation from the behavioral sciences in support of the latter alternative. Advocates "Quantum leap experimentation with innovative subsystems based on images of man, a metamodel of a guided dialetic between structure and openness (process model for more gradual system modification), and selected adjunct strategies to serve as necessary lubricants for both short- and long-range changes." (p. 100)

245. Tickton, Sidney G. and Ronald Gross. *Major Problems Facing Public Schools in the Seventies.* N.Y.: Academy for Educational Development, March 1968. 45 pp. mimeo. (Prepared for the Commission on Trends and Perspectives of the United States Chamber of Commerce.)

Brief descriptions of major problems (goals, control, financing, curriculum, teachers and teaching, facilities, equality, evalaution, and innovation) with outlines of alternative approaches toward solving each of them. A clearly written overview. Recommended.

246. Umans, Shelley. *The Management of Education: A Systematic Design for Educational Revolution.* Garden City: Doubleday, 1970. 226 pp. $5.95.

The Director of the Center for Innovation of the NYC Board of Education discusses PPBS, change models, educational programs of industry and government, and various trends in electronic media. Advocates a new educational system, "incorporating only those elements of education that have proven to be important." (p. 23). The "Blueprint for the Future" envisions the total community as the school, with the school building of today just one small station, along with educational environment centers (neighborhood facilities offering a full range of services for all people at all times), satellite development centers, block schools, skills centers, and the "'No School' School." Recommended.

247. U.S. Congress. House Committee on Education and Labor, General Subcommittee on Education. *Needs of Elementary and Secondary Education for the Seventies: A Compendium of Policy Papers.* Washington: USGPO, Committee Print, March 1970. 982 pp.

"The first section of the compendium consists of essays which have been prepared at the invitation of the Subcommittee by a distinguished group of more than a hundred university faculty members and administrators, industrialists and businessmen, journalists, social philosophers, professional educators, educational researchers, scientists, and other prominent citizens, reflecting perhaps every shade of opinion about education. They have been asked both to predict what will be the compelling issues of the seventies and beyond and to suggest potentially fruitful alternatives. The choice of specific topics, however, has been left to the individual writers.

"The second section of the anthology is comprised of the formal statements which were submitted by witnesses when they testified at the Subcommittee hearings.

"This collection of papers represents perhaps the most extensive survey of the educational needs of the seventies that has been attempted to date." (Foreword by Congressman Roman C. Pucinski, p.v.)

Such a self-assessment can only be heartily seconded. This document is a gold mine, a non-indexed encyclopedia of alternatives. Recommended.

248. U.S. Congress. Senate Committee on Labor and Public Welfare, Special Subcommittee on Indian Education. *Indian Education: A National Tragedy—A National Challenge.* Washington: USGPO, November 1969. [illegible]20 pp. $1.00.

The work of the subcommittee, chaired by Sen. Edward Kennedy, fills 4,077 pages in 7 volumes of hearings and 450 pages in 5 volumes of committee prints. This report is a condensation, concluding with 60 recommendations for action. "We are shocked at what we discovered. . . . We have concluded that our national policies for educating American Indians are a failure of major proportions. They have not offered Indian children—either in years past or today—an educational opportunity anywhere near equal to that offered the great bulk of American children." (p. xi).

B. CURRICULUM

249. Goodlad, John I. *The Changing School Curriculum.* N.Y.: Fund for the Advancement of Education, 1966, 122 pp.

An authoritative summary of changes in curricula marked by updating of content, reorganization of subject matter, and new methods. Recommended.

250. Berman, Louise M. *New Priorities in the Curriculum.* Columbus, Ohio: Charles E. Merrill Publishing Co., 1968, 241 pp. Bib., pp. 197–238.

A well-researched proposal "to open up the possibility of the development of process-oriented persons within our schools." Each chapter discusses a process and the need for it: perceiving, communicating, loving, decision-making, knowing, organizing, creating, and valuing. Bibliography of about 600 items. Recommended.

251. Westin, Allen F. et al. *Civic Education in a Crisis Age: An Alternative to Repression and Revolution.* N.Y.: Columbia University, Center for Research and Education in American Liberities. September 1970. 27 pp.

Finds that a large majority of nearly 7000 junior and senior high school students surveyed feel they are regularly subjected to undemocratic decisions, and proposes ten objectives for civic education. Recommended.

252. Michaelis, John, Ruth Grossman, and Lloyd Scott. *New Designs for the Elementary School Curriculum.* N.Y.: McGraw-Hill, 1968. 428 pp.

"Presents an up-to-date view and an understanding of important developments in all the subject areas of the elementary curriculum. Also provides some guidelines for those who plan curricula." (Advt.)

253. Umans, Shelly. *New Trends in Reading Instruction.* N.Y.: Teachers College Press, 1963. 145 p.

254. Fenton, Edwin. *The New Social Studies.* N.Y.: Holt, Rinehart & Winston, 1967. 144 pp.

An historian's report on recent curricular changes.

255. Brubaker, Dale L. *Alternative Directions for the Social Studies.* Scranton, Pa.: International Textbook Co., 1967. 63 pp.

256. Taylor, Harold (ed.). ***The Humanities in the Schools: A Contemporary Symposium.*** N.Y.: Citation Press, 1968. 176 pp. $2.65.

Papers presented at a University of Kentucky conference. Especially see "Films and the Future" by Stanley Kaufmann.

257. "The Future and Aesthetic Education" (Special Issue), ***Journal of Aesthetic Education***, 4:1, January 1970. (Single copies for $2.25 from University of Illinois Press, Urbana.)

258. Advisory Council on Vocational Education. *Vocational Education: The Bridge Between Man and His Work.* General Report of the Advisory Council. Washington: U.S. Office of Education. November 1968. 220 pp. $2.25.

Part I reviews growth and development, financing, administration, research, teacher education, vocational guidance, supporting services, and contemporary local programs. Part II deals with achievements and limitations, social and manpower environments of vocational education, and innovations and new directions (including an excellent summation of 15 trends on p. 191). It is concluded that "there is a growing recognition that far too many youths are leaving school inadequately prepared to enter the labor market and that the schools must assume the responsibility for the vocational preparation for a much larger portion of the school population than they are now accommodating." (p. 193) Part III offers 23 legislative recommendations (including the formation of a Department of Education and Manpower Development at the Cabinet level), and three administrative recommendations directed to the Commissioner of Education (including the establishing of a Learning Corps). Recommended.

259. Panel of Consultants on Vocational Education. ***Education for a Changing World of Work.*** Report of the Panel Prepared at the Request of the President of the United States. Washington: U.S. Office of Education, OE-80021, 1963. 296 pp. $1.25.

Offers a pleathora of recommendations for expanding vocational education.

260. ***The Report of the Commission on Obscenity and Pornography.*** N.Y.: Bantam Books, October 1970. 700 pp. $1.65. (Also in Random House hardcover.)

The three positive approaches recommended for the development of healthy attitudes toward sexuality entail sex education, industry self-regulation, and citizen action groups. The analysis of existing programs and the recommendation for expanded programs for both children and parents appears on pp. 33–37 and pp. 311–329. "There is a considerable gap between what the schools are presently teaching and what the students wish they would teach." (p. 322).

261. Breasted, Mary. ***Oh! Sex Education!*** N.Y.: Praeger, 1970. $7.95. A journalist's candid and witty look at both sides of a highly emotional issue.

262. U.S. Department of Health, Education, and Welfare, National Institute of Mental Health. ***How to Plan a Drug Abuse Education Workshop for Teachers.*** Washington: USGPO. Public Health Service Publication No. 1162 (or No. 1962—both numbers listed in different places), November 1969. 35 pp. $.25.

Although largely a parochial how-to-do-it manual, there are several "concepts" for effective education that should be heeded in this important and highly sensitive area of contemporary concern: distinguishing between drug use and abuse, considering that we live in a drug-using society, avoiding untruths, exaggerations, sensationalism, and moralizing, and recognizing that "some drug use in school presumably stems from disaffection with the educational process." It is important that schools do not inadvertently aggravate the problem: "Educational efforts that do not cover the entire spectrum of drugs, including tobacco and alcohol, strike students as examples of adult hypocrisy and deafen young ears." (p. 1) An annotated bibliography of 26 items is provided.

263. Grabman, Arnold B. *The Changing Classroom: The Role of the Biological Sciences Curriculum Study.* Garden City: Doubleday, 1969. 370 pp. $6.95.
According to the author, there were 235 curriculum studies in science and mathematics in 1968, of which about 120 were in the U.S. This scholarly history of one such study, the BSCS, is "for anyone interested in reshaping the schools in which he teaches or in which his children are taught." (back cover) Grabman concludes that "a promising method for our time is to develop an inquiry-oriented instruction" (p. 291), and, in looking at the pattern of development of the products of the BSCS, it is noted that "one could predict a fully articulated teaching-learning program in the biological sciences for the total school years." (p. 293.)

264. Boocock, Sarane S. and E. O. Schild. *Simulation Games in Learning.* Beverly Hills, Calif.: Sage Publications, 1968. 279 pp.
Intended for educational practitioners and behavioral scientists as "an introduction to a new and, we believe, powerful educational technology" (p. 13). Part IV, "Perspectives for the Future" discusses political science games in the problem-solver state, the Life Career Game, and some implications of gaming for the school system.

265. Abt, Clark B. *Serious Games.* N.Y.: Viking, 1970. 176 pp. $5.95. General view of improving education with games, with emphasis on games for the physical and social sciences, disadvantaged groups, occupational choice, and planning and problem solving.

266. Clark, Jere W. and Juanita S. CLARK (eds.). *Systems Education Patterns on the Drawing Boards for the Future.* Highlights of The Second Annual National Conference on General Systems Education. New Haven: Southern Connecticut State College, Center for Interdisciplinary Creativity. April 1969. 42 pp.
Addressed to the problem of information overload, this conference of educators, representatives of industry and government, and systems theorists was convened "to explore possibilities for major curriculum surgery, particularly in the area of the social sciences." Advocates conceptual skills for the future, based on the holistic systems approach.

267. Dunstan, Maryjane and Patricia W. GARLAN (eds.). *Worlds in the Making: Probes for Students of the Future.* Englewood Cliffs: Prentice-Halls, 1970. 370 pp. Paper, $4.95.
A textbook/anthology of writings, poems, cartoons, and art dealing with the future. Questions are periodically inserted to stimulate student thinking.

C. GOVERANCE

268. Koerner, James D. *Who Controls American Education? A Guide for Laymen.* Boston: Beacon Press, 1968. 210 pp. $2.45 paper.
After a pithy discussion of the federal government, teacher organizations, other national organizations, state government, and statewide groups, Koerner concludes that "all in all, I think our chances are reasonably good of restoring both the teacher and the scholar to a prominent role in educational policy, but not very good for restoring the layman to a position of primacy. Desirable as the latter reform may be, we must face the fact that the main currents of American educational development are flowing mostly away from the ordinary citizen and toward a new coalition of specialists—school administrators, classroom teachers, academicians, federal and state educational officials, along with an assortment of other kinds of specialists (foundation, testing, accrediting, and manufacturing-publishing executives) that I have discussed. Laymen will probably attain a greater voice in inner-city education, but no one can predict with what results; nor is there any reason to think that the lay role will enlarge in other educational areas.

"The new order will be better than the old, if for no other reason that the fact that it will be less insular than the old, better educated itself, and more representative of the entire educational community." (pp. 173–174).

Although otherwise an excellent overview of who controls what, Koerner (like others up until recent developments have forced the issue into consciousness), fails to make any mention of student power as a—if not the—most potent force for change.

269. Bendiner, Robert. *The Politics of Schools: A Crisis in Self-Government.* N.Y.: Harper & Row, 1969. 240 pp. $6.95.

A political reporter's cogent account of American school boards and their declining capacity to govern, with various alternatives considered. State control is seen as undesirable for various reasons, and there is little danger (or hope) of the federal government taking over. Decentralization ("The Desperate Throwback") would intensify segregation and inequality. In the final chapter, school unification is advocated, for "the bigger the arena, the less provincial and one-sided the politics that prevail" (p. 210), and Toronto's Metro concept of federation is held up as a successful model.

270. Iannaccone, Lawrence. *Politics in Education*, N.Y.: The Center for Applied Research in Education. 1967. 112 pp.

Employing a general systems approach, the author discusses politics preferred by pedagogues, the changing state politics of education, and change and local district politics. The final chapter on the future suggests that the educational politics to come may be far more open than heretofore, with more fragmentation patterns in the immediate offing due to organized teacher militancy.

271. Ziegler, Harmon L., Jr. *The Politics of Education.* Indianapolis: Bobbs-Merrill, Spring 1971.

272. Syracuse University Research Corporation, Policy Institute. *Disruption in Urban Public Secondary Schools.* Syracuse: SURC Policy Institute (723 University Ave.), August 1970. 61 pp.+Appendices. (Prepared for USOE)

A broad survey of the literature combined with 27 on-site visits and 683 usable questionnaires. Of the urban high schools surveyed, 85% experienced some type of disruption during the last three years, and disruptions were found to be more frequent in racially integrated schools. The traditional punitive methods of dealing with disruptions (expulsion, arrest, in-school detention, etc.) are seen as often producing counterproductive results. Many remedies are proposed, including overcoming bigness, recruiting and promoting black personnel, special schools for disruptive students, utilizing young adult security personnel etc. Recommended.

273. Fish, Kenneth L. *Conflict and Dissent in the High School: An On the Scene Analysis.* N.Y.: Bruce Publishing Co., 1970. $6.95.

"A comprehensive, nationwide study of student unrest by a high school principal for the National Association of Secondary Schools under a grant from the Ford Foundation. A first hand report on why eruptions occur with recommended action for the future." (advt.)

274. Divoky, Diane. "Revolt in the High Schools: The Way It's Going to Be." *Saturday Review*, February 16, 1969.

Discusses the spread of the underground high school press to form a network of nearly 500 papers and the growth of activist organizations on the high school level. Somewhat obsolete by now.

275. Lurie, Ellen. *How to Change the Schools: An Action Handbook for Parents Who Want to Fight the System.* N.Y.: Random House, January 1971. 280 pp. (Also Vintage paper, October 1970, $2.95.)

Discusses recruitment and evaluation of teachers, how to get rid of incompetent teachers, and how to reform the curriculum.

276. Lieberman, Myron. *The Future of Public Education.* University of Chicago Press, 1960. 294 pp.

A competent critic discusses trends with a fiery denounciation of the the status quo—especially local control of education. A "revolution" is predicted (and advocated) in terms of a changing power distribution toward greater teacher control (student power not considered, however). Otherwise, little to do with the future.

277. Levin, Henry M. (ed.). *Community Control of Schools.* Washington: Brookings Institution, Studies in Social Economics, 1970. 318 pp. $7.50.

278. Fein, Leonard J. *Schools and Community Control.* N.Y.: Pegasus, February 1971. $6.95; $1.95 paper.

279. Agger, Robert and Marshall N. Goldstein. *Who Will Rule the Schools? A Cultural Class Crisis.* Belmont, Cal.: Wadsworth Publishing Co., 1970. 210 pp.

280. Fantini, Mario, Marilyn Gittell, and Richard Magat. *Community Control and the Urban School.* Introduction by Kenneth B. Clark. N.Y.: Praeger, July 1970. 288 pp. $7.95; $2.95 paper.

"A comprehensive study of the participation issue in urban public schools. Tracing the development of public education and the bureaucratization of school systems since the 1900's, the authors examine where and for whom the attempt to provide universal education failed. They offer a persuasive case for community control as a means of achieving the participation they consider to be an intrinsic part of the education process." (advt.)

281. Wasserman, Miriam. *The School Fix, NYC, USA.* N.Y.: Outerbridge and Dienstfrey, 1970. 568 pp. $10.00.

Describes the inner workings of a New York City public school, interpreted in terms of a conspiracy theory against the poor, and advocates community control as a necessary response.

D. URBAN SCHOOLS

282. Downs, Anthony. *Urban Problems and Prospects.* Chicago: Markham Publishing Co., October 1970. 293 pp. $7.95; $3.95 paper.

Eleven essays, including Alternative Forums of Future Urban Growth in the U.S., Alternative Futures for the American Ghetto, Racism in America and How to Combat It, A Realistic Look at the Final Payoffs from Urban Data Systems, and Competition from Community Schools.

283. Glazer, Nathan (ed.). *Cities in Trouble.* A New York Times Book. N.Y.: Quadrangle, 1969. 256 pp. $6.95.

"Commentators on urban affairs dissect the components of the crisis: schools, blacks, immigrants, crime and violence, jobs, political corruption, welfare, labor unrest, and the physical environment . . . asks tough questions and offers realistic answers." (advt.)

284. Canty, Donald. *A Single Society: Alternatives to Urban Apartheid.* N.Y.: Praeger, 1970. 192 pp. $5.95; $2.45 paper.

"Offers a national strategy for implementing our commitment to a just and fair society, delineates specific programs in the areas of jobs and income, housing and environment, and education and social welfare, and analyzes long-range plans to break the pattern of ghetto separation." (advt.)

285. Hodge, Patricia Leavy and Philip M. Hauser. *The Challenge of America's Metropolitan Outlook, 1960 to 1985.* Prepared for The National Commission on Urban Problems. N.Y.: Praeger, 1968. 90 pp.

Two prominent demographers project the further suburbanization in Standard Metropolitan Statistical Areas, and the growing concentration of nonwhites in central cities. "The problems facing the central city schools—especially in respect to integration—are highlighted by an anticipated almost doubling (92 percent) of nonwhite youngsters under 15, while corresponding white youth would diminish by 8 percent." (p. 55) "The projections clearly indicate that the present 'urban crisis' is likely to be greatly exacerbated in the coming years and that serious difficulties will face the nation in respect to intergroup relations, education, employment, housing, and provisions for the aged." (p. 57)

286. Banfield, Edward C. *The Unheavenly City: The Nature and Future of Our Urban Crisis.* Boston: Little, Brown, 1970. 308 pp. $6.95.

A social scientist's sophisticated hard-nosed, and gloomy analysis of urban problems in the light of scholarly findings. "So long as the city contains a sizable lower class, nothing basic can be done about its most serious problems." (p. 210) "It is impossible to avoid the conclusion that the serious problems of the cities will continue to exist in something like their present forms for another twenty years at least." (p. 255) Present programs are seen as prolonging these problems and perhaps making them worse. In part this is due to false definitions of the situation, perpetuating a "reign of error," e.g., defining so many situations as "critical." In Chapter 7, "Schooling vs. Education," Banfield advocates lowering the school-leaving age to 14 to get nonlearners out of school and therefore stop their antieducation, and the possibility of school districts contracting with industry for job training. Possibilities for changing schooling are not considered. In Chapter 10, various alternatives to free children from the grip of lower-class culture are explored, such as state removal from parents, boarding schools, and day nurseries—but little hope is offered here or in other areas, other than the possibility of replacing the conventional wisdom of do-gooding over the next decade or two as a consequence of social science brought to bear on policy questions.

287. National Advisory Commission on Civil Disorders. *Report of the National Advisory Commission on Civil Disorders.* Special introduction by Tom Wicker. N.Y.: E. P. Dutton and Bantam Books, March 1968. 609 pp.

Based on Chapter 16 ("The Future of the Cities"), Chapter 17 ("Recommendations for National Action") contains an excellent survey of inner city education, with many proposals for reform. (pp. 424–457) Recommended.

288. Conant, James Bryant. *Slums and Suburbs: A Commentary on Schools in Metropolitan Areas.* N.Y.: McGraw-Hill, 1961. 147 pp.

A well-known book covering Negro education, schools and jobs, curriculum, and contrasts between slum schools and the college-oriented suburban schools. Concludes with 17 recommendations, including the warning that "social dynamite is building up in our large cities." (p. 146) The explosion occurred six years later.

289. Green, Thomas F. "Schools and Communities: A Look Forward." *Harvard Educational Review*, Spring 1969.

A philosopher's discussion of school-community relationships in the 1980–1990 period, focused on both change and continuity.

290. *Community and the Schools.* Harvard Educational Review, Reprint Series No. 3, June 1969. 176 pp. $3.50.

Seven recent articles examining the past and future of community schools, community control, and the possibilities of a new community.

291. Havighurst, Robert J. (ed.). *Metropolitanism. Its Challenge to Education.* Sixty-Seventh Yearbook of the National Society for the Study of Education. Part I. University of Chicago Press, 1968. 393 pp.

16 Articles in five sections: the metropolitan setting; organizing, staffing, and financing education in metropolitan areas; metropolitan education and local state, and national government; developments and problems in metropolitan areas; and metropolitan frontiers (examples from Hartford, Nashville, and the Twin Cities).

292. Havighurst, Robert J., Frank L. Smith, Jr., and David E. Wilder. *A Profile of the Large City High School.* Washington: National Association of Secondary School Principals, 1970.

A study of 700 high schools in 45 cities with more than 300,000 population, recommending new approaches such as a single experimental high school at a central location, temporary shifting of faculty to provide more racial integration and distribution of experience, allowing students to divide attendance among two or more schools, employing an open attendance rule allowing inner-city students to enroll in comprehensive or middle-class schools, and constructing one or more large high schools in a kind of educational park enabling greater diversity of students.

293. *Report to the President of the Urban Education Task Force.*

An underground document of sorts, prepared by a task force headed by Wilson C. Riles, newly elected Superintendent of Public Instruction in California. Excerpts hrave appeared in the *Congressional Record* for January 19, 1970, and, according to Tom Wicker, it has been published in full by Praeger. (*New York Times*, November 8, 1970, Section 4, p. 13.) Proposes an increase in funding of about 50% per pupil in city schools, and takes a critical attitude toward the professional educational establishment.

294. Bernstein, Abraham. *The Education of Urban Populations.* N.Y.: Random House, 1967. 398 pp. $3.95, paper.

"A new type of introductory education text, aimed at a new kind of teacher-candidate, and intended for new circumstances in education." (p. vii). Analyzes minority problems and suggests specific methods recognizing and utilizing minority backgrounds. Bernstein advocates stipends to pupils; an extended school day, week, and year; the recruitment of a new type of teacher; and necessary changes in administrative attitudes and training programs.

295. Street, David (ed.). *Innovation in Mass Education.* N.Y.: Wiley-Interscience, 1969, 342 pp.
Eleven articles on urban education dealing with inner city experimentation, nongrading in a slum school, controlling behavior problems, urban teacher education, community action programs and school systems, nonprofessionals, conflict over educational change, IQ scores, and institution building.

296. National Education Association. *Schools of the Urban Crisis.* Washington: NEA, 1969. 58 pp.
Advocates that the federal government pay at least one-third of the cost of public schooling in major cities.

297. Pressman, Harvey. *New Schools for the Cities: Designs for Equality and Excellence.* A Working Paper. Prepared for the Citizens Crusade Against Poverty. Washington: New Community Press, 1970. 48 pp.

298. Rudman, Herbert C. and Richard L. Featherstone (eds.). *Urban Schooling.* N.Y.: Harcout, Brace & World, 1968, 320 pp.
"Ten experts discuss the problems of inner-city education and set forth a plan for cooperation between urban universities and urban school systems." (advt.)

299. Fantini, Mario D. and Milton A. Young. *Designing Education for Tomorrow's Cities.* N.Y.: Holt, Rinehart and Winston, 1970. 160 pp., paper.
Present educational systems are found to be outmoded and inadequately structured (has anyone yet to find them adequate?), and, as a suggestion for strategies of major reform, the authors use the development of the Fort Lincoln New Town school system in Washington, D.C., as a case study.

300. Fantini, Mario and Gerald Weinstein (eds.). *Making Urban Schools Work: Social Realities and the Urban School.* N.Y.: Holt, Rinehart & Winston, 1969. 62 pp. $1.50.
Proposes a school that would allow children to examine urban stresses and learn how to deal constructively with them.

301. Fantini, Mario D. and Gerald Weinstein. *The Disadvantaged: Challenge to Education.* N.Y.: Harper & Row, 1963. 455 pp.

302. Marcus, S. and H. N. Rivlin (eds.). *Conflicts in Urban Education.* N.Y.: Basic Books, 1970. $6.95.

303. Campbell, Roald F. et al (eds.). *Education and Urban Renaissance.* N.Y.: John Wiley, 1969. 148 pp.

304. Gittell, Marilyn and Alan G. Hevesi (eds.). *The Politics of Urban Education.* N.Y.: Praeger, 1969. 386 pp.
A reader presenting a timely selection of urban reform proposals. Five articles particularly concerned with community control of the schools.

305. Gittell, Marilyn and T. Edward Hollander. *Six Urban School Districts: A Comparative Study of Institutional Response.* N.Y.: Praeger, 1968.
A comparative analysis of fiscal and administrative operations of school systems in Baltimore, Chicago, Detroit, New York, Philadelphia, and St. Louis, suggesting some new approaches for evaluation of large city school systems by using innovation as an output. Bibliography of about 250 unannotated entries on school administration and the politics of education.

306. Gittell, Marilyn (ed.). *Educating an Urban Population.* Beverly Hills, Cal.: Sage Publications, 1970 (?). 320 pp. $8.95; $3.95 paper.
"Presents a cross-section of current social research and thinking on the problems of urban education within a framework of concern for the broader implications of urban development and the policy-making process. Among the contributors: Seymour Sacks, Robert J. Havighurst, Charles Glatt, Alan K. Campbell, Louis H. Masotti, Werner Z. Hirsch, David Minar, and Thomas F. Pettigrew." (advt.)

307. Sizer, Theodore R. "Education in the Ghetto: The Case for a Free Market," *Saturday Review*, January 11, 1969.
The Dean of the Harvard School of Education discusses four alternatives (decentralization, public money for minority private schools, contracting for texts and teachers in certain areas, and giving public money directly to children). All of these programs would directly increase competition. Other interconnected policies are advocated, such as discrimination in favor of poor children and integration, equalization of state

financial resources, discrimination in favor of imaginative schools and school districts and the development of national and independent "consumers' unions" to evaluate school materials and industrial contractors' plans.

308. Smiley, Marjorie B. and Harry L. Miller (eds.). *Policy Issues in Urban Education.* N.Y.: Free Press, 1968. 490 pp.

A companion volume to Miller and Smiley, *Education in the Metropolis* (N.Y.: Free Press, 1967). Various readings divided into three sections: Challenge to the Teacher, What Curriculum for the Disadvantaged?, and Redressing the Imbalance of the Urban School.

309. Thomas, Thomas C. *On Improving Urban School Facilities and Education.* Menlo Park: Stanford Research Institute, Educational Policy Research Centre, Policy Research Report EPRC–6747–1, May 1969, 126 pp.

An examination of education parks, minischools (storefronts), and neighborhood schools in terms of the reactions by the following stakeholders: white liberals, prointegration blacks, prolocal control blacks, and teachers. It is concluded that "For different reasons, neither of the two facility innovations—education parks and minischools—offer much promise to urban education. One probably should not be implemented, and the other probably will not be implemented. Neighborhood schools will most likely remain in the choice of most school districts (p. 125). Nevertheless, "there will be considerable educational change over the next decade, though it may be cloaked in violence." (p. 126).

E. FACILITIES AND TECHNOGY

310. Toffler, Alvin (ed.). *The Schoolhouse in the City.* New York: Praeger, 1968. 255 pp.

Sponsored by Stanford and Educational Facilities Laboratories, 21 authors offer answers on urban school construction problems, present case studies of developments in three cities (educational parks in Baltimore and Pittsburgh; Linear City in Brooklyn), and project the possible future of the schoolhouse in the city.

311. Educational Facilities Laboratories. *Schools Without Walls.* New York: EFL (477 Madison Ave.), June 1965. 56 pp. Free.

Many examples in print and photographs of "open-space schools" that provide unbroken space containing anywhere from three to five regular-size groups of children and their teachers: "an educational process unbound by the barriers built into the conventional schoolhouse with its rows of standard classrooms . . . an environment which encourages greater interaction between teacher and pupil, and between teacher and teacher. There are no partitions to fragment learning by dividing teachers, children and subject matter into tight standardized compartments. And there are no halls to funnel children from compartment to compartment at the arbitrary dictate of a bell. Each child finds his own place, creates his own path." (p. 3). Such post-industrial, post-linear prescription is very much the wave of the future.

312. Kohn, Sherwood. *The Early Learning Center: Stanford, Conn.* New York: Educational Facilities Laboratories (477 Madison Ave.), Jan. 1970. 30 pp. Free.

Pictures, plans, and less than a thousand words are sufficient to powerfully convey the sense of an open learning system for 2–8 years olds that promotes random experiences through a flexible environment or "omnidirectional space."

313. Educational Facilities Laboratories. *Educational Change and Architectural Consequences.* A Report on Facilities for Individualized Instruction. New York: EFL, 1968. 88 pp. Free.

In view of the new "spirit of innovation, experimentation, venturesomeness" four school designs are suggested (preprimary, primary, middle, and secondary) "as a stimulus to open up the options in school design," in that "Too many of our schools still stand as handicaps to new programs and new thinking in education." (p. 85).

314. Castaldi, Basil. *Creative Planning of Educational Facilities.* Chicago: Rand McNally, 1969. 364 pp.

Although largely a textbook with the conventional array of platitudes, the concluding portions (pp. 333–352) provides a quick overview of architectural trends in the future design of educational facilities and instructional concepts underlying future facilities. The master trend is away from the conventional box toward forms facilitating maximum flexibility.

315. Council of Educational Facility Planners. *Educational Facilities in Urban Settings.* Columbus, Ohio (29 W. Woodruff Ace.): CEFP, 1968. 64 pp.

Presentations at 167 CEFP Annual Conference, with proposals such as educational parks, urban planning, and demographic studies of need.

316. Rice Design Fete IV (School of Architecture, Rice University). *New Schools for New Towns.* Sponsored by Educational Facilities Laboratories, 1968 (?). 60. pp.

A collection of very far-out ideas of possible designs aimed at "a new kind of intermix between eduaction and community." Based on a naive view of a linked-in society of willing learners who eagerly consume knowledge at the end of a dispensing pipeline. Thus, "commuting time should become, whenever possible, learning time" and various auto links are proposed. Continuing with autos, educational service stations and "drive-in study units" are suggested. Then there are mobile study carrels, equipped for individual study, data retrieval, thought, and rest. Abolishing the classroom, a Town Brain is offered "to transmit learning" to town residents of all ages. "The schoolhouse will disappear—or linger as a memorial to preelectronic learning." No comments on whether this is wanted or desirable . . . but, of course, demand can always be created.

317. National Commission on Technology, Automation, and Economic Progress. *Educational Implications of Technological Change.* Appendix Volume IV to *Technology and the American Economy.* Washington: U.S. Government Printing Office, February 1966.

Especially see James D. Finn. "The Emerging Technology of Education" (pp. 33–52), an overview of trends in the 1955–65 period, and a forecast for the period 5–10 years ahead concerning innovation, the new "educational establishment," systemization of materials, developments in hardware, information storage and retrieval, standardization, the National Assessment program, administration, R&D educational psychology, and the new educational "industry." Additional reports under the heading of "Education in the United States: Status and Prospect" (pp. 67–150) provide recommendations on adult education, education for employment, civic education, compensatory education, and the role of the federal government in the years ahead. Recommended.

318. U.S. Congress. House of Representatives, Committee on Education and Labor. *To Improve Learning: A Report to the President and the Congress of the United States by the Commission on Instructional Technology.* Washington: U.S. Government Printing Office, March 1970. 124 pp. $.50.

Concludes that technology could bring about far more productive use of the teachers' and the students' time, but "that one-shot injections of a single technological medium are ineffective. At best they offer only optional 'enrichment.' Technology, we believe, can carry out its full potential for education only insofar as educators embrace instructional technology as a system and integrate a range of human and nonhuman resources into the total educational process." (p. 7).

The report recommends establishing the National Institute of Education within the Department of Health, Education and Welfare, and a National Institute of Instructional Technology within the NIE. The NIIT would establish a resource center, conduct demonstration projects, train and retrain teachers and specialists, and bring education and industry together.

The Commission, chaired by Sterling M. McMurrin, and staffed by members of the Academy for Educational Development, will publish its full report in two volumes through the R. R. Bowker Co. Appendix G of this summary report lists about 140 papers prepared at the request of the Commission and about 80 papers sent to the Commission for information. Presumably, these will be drawn together in the full report.

319. Morphet, Edgar L. and David L. Jesser (eds.). *Planning for Effective Utilization of Technology in Education.* Denver: Designing Education for the Future—An Eight State Project, August 1968. 372 pp.

32 reports prepared for a national conference. Many of the statements are from representatives of potential supplying organizations. Volume 8 in a continuing series.

320. Fuchs, Walter R. *The New Learning: Technology in the Service of Education.* New York: Herder and Harder, 1970. $8.50.

"Describes the new technical innovations which will influence education in the future, and illustrates how these present-day developments embody the philosophies of great teachers in the past. This book provides a clearly written interpretation of the current revolution in education for both the layman and the expert. (Advt.) Insofar as the "revolution," see the following item.

321. Oettinger, Anthony, with the collaboration of Sema Marks. *Run, Computer, Run: The Mythology of Educational Innovation.* Harvard Studies in Technology and Society. Cambridge: Harvard University Press, 1969. 302 pp. $5.95.

An authoritative, caustic, myth-crumbling essay concluding that "The formal education system is bound to society in a way that is almost ideally designed to thwart change. Little *substantive* technological change is therefore to be expected in the next decade." (p. 215) The "present innovative fad . . . favors highly visible quickie approaches creating the illusion of progress." (p. 229) Recommended.

322. Oettinger, Anthony and Sema Marks. "Educational Technology: New Myths and Old Realities" and a "Reply" to Six Critics. *Harvard Educational Review,* 38: 4, Fall 1968.

323. Aerospace Education Foundation. *Technology and Innovation in Education: Putting Educational Technology to Work in America's Schools.* N.Y.: Praeger, 1969. 149 pp.

The Foundation, an affiliate of the Air Force Association, "adapted as a priority goal the exploration of the potential of the new educational technology—much of it developed by the Air Force through the use of the systems approach—for the enhancement of America's civilian schools." (p. ix) Based on a seminar entitled "Education for the 1970's," the book is divided into three sections: behavioral technology (motivation), the computer as an educational tool, and the forces shaping education.

324. Margolin, Joseph B. and Marion R. Misch (eds.). *Computers in the Classroom: An Interdisciplinary View of Trends and Alternatives.* N.Y.: Spartan Books, 1970. 382 pp. $14.00.

The result of a traveling seminar of 12 senior scientists and educators, the back cover advertises "the first published book to present the issues and alternatives that will confront education as computers make their way into the nation's schools." The summary chapters by the editors (pp. 285–389) provide some non-startling "predictions" (such as the computer accelerating educational research and aiding management and counseling) and a wide array of cautious prescriptions to enhance technological adaptation. The volume appears to be comprehensive, but uncritical in its advocacy.

325. Bushnell, Don D. and Dwight W. Allen (eds.). *The Computer in American Education.* N.Y.: Wiley, 1967. 300 pp.

Proceedings of a conference sponsored by the Association for Educational Data Systems.

326. Caffrey, John G. *The Impact of the Computer on School Systems.* Santa Monica: Systems Development Corp., SP–1803, September 23, 1964. 9 pp.

327. Loughary, John *Man-Machine Systems in Education.* N.Y.: Harper & Row, 1966. 242 pp.

328. Kay, Harry, Bernard Dodd, and Max Sime. *Teaching Machines and Programmed Instruction.* Baltimore: Jenguin, 1968. 173 pp.

Final chapter discusses "Social Implications of an Effective Technology."

329. Watson, Goodwin (ed.). *No Room at the Bottom: Automation and the Reluctant Learner.* Washington: National Education Association (Project on the Educational Implications of Automation), 1963. 1[illegible]2 pp.

Based on proceeding of a 1962 symposium.

330. Brickman, William W. and Stanley Lehrer (eds.). *Automation, Education, and Human Values.* N.Y.: School and Society Books, 1966. 419 pp. Bib. 373–390.

33 papers largely developed in connection with a major project of the Penn State Center for Continuing Liberal Education that is concerned

with the impact of technological change on the individual. Bibliography of about 200 items grouped by social trends, technological change, cybernetics and computers, work and leisure, etc.

331. Evans, Luther H. and George E. Arnstein (eds.). *Automation and The Challenge to Education.* Washington: National Education Association (Project on the Educational Implications of Automation), January 1962. 190 pp.

15 articles derived from a symposium.

332. Carter, Launor and Harry Silberman. *The Systems Approach, Technology and the School.* Santa Monica: Systems Development Corporation, SP–2025, April 1, 1965. 30 pp.

Discusses various computer applications as a means of approaching a model of "The 'Ideal' School."

333. Silberman, Harry F. *Trends in Educational Technology.* Santa Monica: Systems Development Corporation, SP–2291, December 13, 1965. 10 pp.

Rather than trends, the paper provides a concise summary of "extrapolations made from current trends in research on instruction to predict the course of future improvements in public education." Mentions more rational sequencing of educational activities, more desired outcomes in student behavior, more time devoted to public education ("many public schools will have become residential boarding schools"), individualized progress rates, increased engineering of human behavior in the direction of national objectives, etc.

334. Coulson, John E. *An Instructional Management System for the Public Schools.* Santa Monica: Systems Development Corporation, TM–3298/002/00, June 12, 1967. 16 pp.

Forecasts the computer applications in a typical urban school district of 1980 or 1985, and discusses the interim Instructional Management System of SDC that will help the school to approach this form.

335. *Educational Screen and Audiovisual Guide* ("Education in 1990 Issue"), 45: 9 September 1966.

Several brief, optimistic, and childish articles, a scenario originally written for the Boy Scouts, and a few words from Margaret Mead on on "The Information Explosion."

F. PERSONNEL

336. U.S. Office of Education. *The Education Professions: 1968. A Report on the People Who Serve Our Schools and Colleges.* Washington: U.S. Government Printing Office, OE–58032, June 1969. 377 pp. $2.75.

A first annual assessment of the state of the education professions, as required by the Education Professions Development Act of 1967. A thorough analysis of trends and future requirements through 1975 at all levels, including preschool, elementary, and secondary programs, vocational, postsecondary vocational, and adult education programs; and undergraduate and graduate education, with analysis of personnel in both public and private institutions, and teacher training at each level. Despite "the lack of adequate and comprehensive data on educational personnel . . . the report will hopefully prove to be a positive step toward building a sophisticated bank of information which can be useful to all levels of education." (p. iii) Recommended.

337. Conant, James Bryant. *The Education of American Teachers.* N.Y.: McGraw-Hill, 1964. 319 pp.

Guided by the values of freedom and responsibility, this thorough study makes 27 recommendations, grouped in the final chapter under five headings.

338. Koerner, James D. *The Miseducation of American Teachers.* Boston: Houghton Mifflin, 1965; Baltimore: Penguin Books, n.d. 360 pp. $1.25.

Based on an extensive study, this scathing critique finds "A weak faculty operates a weak program that attracts weak students." (p. 242) Concludes with 13 recommendations to preserve and strengthen the basic structure of professional education, including: shutting down teacher's colleges or converting them to general institutions, utilizing the regular 4-year undergraduate program as the standard preparation for teachers, raising grade point averages for admission to teacher education programs, a drastic reduction in the number of education specialties and subspecialties, etc.

339. Stone, James C. *Breakthrough in Teacher Education.* San Francisco: Jossey-Bass, 1968. 206 pp. $7.50.

Discusses the Breakthrough Programs (largely sponsored by the Ford Foundation): "a scattering of models from which new patterns in teacher education might spread. Most of the Nation's colleges continue to prepare the majority of future teachers in conventional programs." (p. 155) Especially see chart of trends in teacher preparation (pp. 175–176) and new models for innovation proposed in the last chapter. Recommended.

340. Smith, B. Othanel. *Teachers for the Real World.* Washington: American Association of Colleges for Teacher Education, 1969. 185 pp.

Based on research by a task force of the NDEA National Institute for Advanced Study in Teaching Disadvantaged Youth. Radical reforms are advocated, including "training complexes," division of the teaching profession into subroles, combining theoretical training with actual classroom problems, etc.

341. Edelfelt, Roy A. *Redesigning the Education Profession.* Washington: NEA, January 1969. 17 pp. Mimeo.

A recent policy statement by the Executive Secretary of the National Commission on Teacher Education and Professional Standards, in which the concept of differentiated staffing is advocated. Such a staff "would include not only teachers but a variety of special service personnel, subject matter specialists, administrators, student teachers, interns, people from other professions, craftsmen, and paraprofessionals." (p. 8)

342. Lindsey, Margaret. *New Horizons for the Teaching Profession.* A Report of the Task Force on New Horizons in Teacher Education and Professional Standards. Washington: National Education Association, 1961. 243 pp.

The final chapter, "The Teaching Profession in the Decades Ahead" has nothing to do with a wider future, but serves to summarize the recommendations for professional standards.

343. Stinnett, T. M. (ed.). *The Teacher Dropout.* Itasca, Ill.: Peacock, 1970. 172 pp. $5.75.

Argues "that before we can cope adequately with the pupil dropout problem we must solve the problem of the teacher dropout" (advt.) Arranged by the Commission on Strengthening the Teaching Profession.

344. King, Edmund J. (ed.). *The Teacher and The Needs of Society in Evolution.* London: Pergamon International Library, 1970. 332 pp. $6.50.

Twelve essays divided into three sections concerning the background of social and technological change, the changing world of the teacher in schools (including an essay on "The Status, Role and Future of Teachers"), and new perspectives on learning and teaching and on the evolving commitments of students and teachers up to the year 2000 (including an essay "From Teaching to Learning").

345. Van Til, William. *The Year 2000: Teacher Education.* Terre Haute: Indiana: Indiana State University, 1968. 35 pp.

After a good discussion of current general futures thinking (Kahn and Wiener, *Commission on the Year 2000*), the implications for education and teacher education are explored. Various trends and possibilities are mentioned, but none that are very surprising. The most interesting part of the paper (outlining the various values and resulting methods of "technologists" vs. "social emphasizers") does not build on the rest of the paper.

346. Rosove, Perry E. *An Analysis of Possible Future Roles of Educators as Derived from a Contextual Map.* Santa Monica: System Development Corp., SP–3088, March 8, 1968. 82 pp.

A subsequent report to item 686 that presents the "complete" results of the experiment in the use of contextual mapping. "The mapping process results in the identification of 98 different possible future roles for educators and also, as a by-product, it identifies 101 potential future issues in education." (p. 3). It is concluded that "the projections of current trends in 18 areas as displayed on the contextual map suggests that (the crisis in education) is merely beginning and will become increasingly complex, fractious, and more costly to resolve in the two decades ahead." (p. 30). To prevent an evolutionary form of drift, four new concepts are proposed: The learning environment as a real time facility (blurring the distinction between work and education); the continuous, vertical, learning organization serving all educational levels; the learning environment as a multipurpose facility; and (the major conclusion of the study as derived from the above three concepts) the generic role of the "learning facilitator" (rather than the present generic role of "teacher") as a counselor, engineer, instructor in the use of learning resources, and researcher.

347. Foshay, Arthur W. (ed.). *The Professional as Educator.* N.Y.: Teachers College Press, 1970. 128 pp. $4.95 paper.

348. Clark, D. L. and J. E. Hopkins. *A Report on Educational Research, Development, and Diffusion Manpower,* 1964–74. Bloomington: Indiana University Research Foundation, 1969.

349. Tope, D. E. (ed.). *A Forward Look: The Preparation of School Administrators, 1970.* Eugene, Oregon: University of Oregon Press, 1962.

350. Southworth, W. D., "The Superintendency—1980." *Clearing House,* 43:2, October 1968, pp. 79–81.

A brief prescriptive portrait, predicated on the observation that "the responsibilities of the superintendency have so increased and multiplied that no single person can any longer satisfactorily fulfill the position." (p. 79). Describes the business-oriented senior school administrator, the senior educator, and the new role of school board members similar to that of corporate directors.

G. FINANCE

351. Coons, John E., William H. Clune III, and Stephen D. Sugarman. *Private Wealth and Public Education.* Cambridge: Harvard University, Belknap Press, 1970. 520 pp. $12.50.

Three lawyers analyze discrimination by wealth in State systems of school finance and American value systems in general, proposing a plan of "power equalizing" based on manipulation of State and local taxes. The primary hope for change is through court actions.

352. Coons, John and Stephen B. Sugarman. *The Family Choice in Education Act: A Heuristic Model for State Education.* Berkeley: Institute for Governmental Studies, Spring 1971. Approx. $1.50. (Also to appear in *California Law Review*, May 1971.)

353. Center for the Study of Public Policy. *Education Vouchers: A Preliminary Report on Financing Education by Payments to Parents.* Cambridge, Mass.: The Center (56 Boylston St.). March 1970. 219 pp.

A report of the first phase of research contracted by USOE which explores the following areas: Determining the value of vouchers and the restrictions (if any) on private supplementation, insuring adequate information for intelligent choices by parents, procedures for allocating scare places, education vouchers compared with state "purchase of services" from private schools, and the relationship of vouchers to racial segregation and the First Amendment prohibition against establishment of religion. The second phase of this important research will demonstrate the feasibility of an experimental project.

354. Bane, Mary Jo. "On Tuition Voucher Proposals," *Harvard Educational Review*, 41:1, February 1971, pp. 79–87.

An essay review of *Education Vouchers* (Item No. 353), *Private Wealth and Public Education* (Item No. 351), and *An Essay on Alternatives in Education* (Item No. 836).

355. Berke, Joel S., Stephen K. Bailey, Alan K. Campbell, and Seymour Sacks. *Federal Aid to Public Education: Who Benefits?* Syracuse: The Policy Institute of the Syracuse University Research Corporation, January 31, 1971. 84 pp.

The first report of a Ford Foundation project to determine the patterns of aid allocation, the decisionmaking processes determining these patterns, and necessary changes.

It was found that "Rural areas receive far more aid proportionately than metropolitan areas, even more than central cities. Many individual aid programs give more help to rich districts than they do to poorer ones. Fund flows over time are so uneven, both within fiscal years and from year to year, that harried school planners often end up shunting Federal aid funds to the least pressing, least important of their academic priorities. And problems of program administration further dilute the effect of Federal dollars." (p. 52).

Some tendencies toward equity were discovered, but considered as "far too little to overcome the basic maldistribution of educational finances in this Nation . . . Until the Federal Government assumes the responsibility for providing an adequate and equitable pattern of aid to education, the crisis in American education will continue." (p. 53).

356. Morphet, Edgar L. and David L. Jesser (eds.). *Emerging Designs for Education.* Denver: Designing Education for the Future: An Eight State Project, May 1968. 240 pp.

Articles on implications of societal changes for the educational program, alternative local school district models, and alternative models for state financing. Vol. 5 of a series. Recommended.

357. National Education Association, Committee on Educational Finance. *Interdependence in School Finance: The City, The State, The Nation.* Proceedings of the Eleventh National Conference on School Finance. Washington: NEA, 1968.

358. New York State Commission on the Quality, Cost and Financing of Elementary and Secondary Education. *Final Report,* November 1971.

The Fleischmann Commission, backed by $900,000 in State funds, will attempt to produce a "politically feasible" report on every facet of the New York education system, to provide information for legislative action in the 1972 session. (For further information, write to The Commission, 800 Second Ave., New York, N.Y. 10017.)

359. Windham, Douglas M. *Education, Equality, and Income Redistribution.* Lexington, Mass.: D. C. Heath, 1970. 120 pp. $10.00.

"An startling appraisal of public education's built-in inequities due to regressive taxation." (advt.)

360. Keyserling, Leon H. *Achieving Nationwide Educational Excellence: A Ten-Year Plan, 1967–1977, to Save the Schools.* Conference on Economic Progress. Washington: December 1968.

361. Freeman, Roger A. *Financing the Public Schools. Vol. I. School Needs in the Decade Ahead.* Washington: Institute for Social Science Research, 1958. 273 pp.

A thoughtful consideration of public school enrollments and expenditures for teachers and buildings in 1970, as viewed from 1958, and aided by 87 tables and 24 charts. The fear that expenditures for public elementary and secondary education would exceed $30 billion in 1970 proved correct, if not an understatement: The public schools cost $36 billion in 1969–70 (current dollars). Freeman asks whether enough is being spent, and how much should be spent, and suggests that standards could be raised at no extra costs by cutting "frills."

362. Freeman, Rogers A. *Financing the Public Schools. Vol. II. Taxes for the Schools.* Washington: Institute for Social Science Research, 1960. 441 pp.

An extensive and scholarly discussion of various taxation alternatives, with the conclusion that "The fiscal case for Federal school aid is contrived, unsubstantiated, and fallacious. The ideological case . . . cannot be proven or rebutted" (p. xxxvii).

363. Erickson, Donald A., "Central Constitutional Questions on Aid to Nonpublic Schools," *State Government,* 43:4, Autumn 1970, pp. 242–252.

II. MISCELLANEOUS

364. Cervantes, Lucius F. *The Dropouts: Causes and Cures.* Ann Arbor: University of Michigan Press, 1965, 244 pp.

A thorough survey of why youth drops out of high school, looking at family, school experience, dropout youth culture, and personality. A multitude of solutions are proposed (pp. 199–218), which suggested actions for community, Government, business, labor, schools, and the family.

365. Effrat, Andrew, Roy E. Feldman, and Harvey M. Sapolsky, "Inducing Poor Children to Learn," *The Public Interest,* No. 15, Spring 1969, pp. 106–112.

In view of the characteristics of lower class subcultures, the authors propose a payment schedule to provide the student with incentives to improve his classroom performance. This proposal is quite amenable to a pilot study.

366. Brim, Orville G., Jr., et. al. *American Beliefs and Attitudes About Intelligence.* N.Y.: Russell Sage Foundation, 1969. 291 pp.

A report of a survey of some 10,000 secondary school students in the 1963–64 period, finding widespread ignorance about intelligence and testing (without questioning these measures).

"It seems to the authors that a humanistic conception of man would hold that each member of society has the right to valid information as to his or her intellectual abilities, to provide a basis for a rational estimate of one's competence, and thus the establishment of reasonable aspirations in those sectors of life where intelligence counts heavily.

"Both the general ignorance and the inequities in knowledge about one's own intelligence seem to come primarily from school policies that keep test score information confidential, and in the possession of the school system, rather than communicating such results to the student or his family" (p. 12).

"If a school were to develop a systematic policy of dissemination of test scores, it could replace the irrational, unevaluated, and probably damaging procedures of the schools at the present time in handling differences in intelligence. It would, however, demand that educators face up squarely to the inequities in the educational system that contribute, at least somewhat, to the test performances . . ." (p. 13).

367. 1985 Committee of the National Conference of Professors of Educational Administration. *Educational Futurism, 1985: Challenges for Schools and Their Administrators.* Berkeley: McCutchan Publishing Corp., June 1971. Approx. 220 pp.

Contents to include "On Confronting the Future" by Walter G. Hack (chairman), "Futurism: Its Development, Content, and Methodology" by Richard C. Lonsdale, "Perspectives on the Educational Program, 1985" by Stephen J. Knezevich, "Governance of Public Education in 1985" by Walter G. Hack, "Organization for Education in 1985" by Conrad Briner and Gerald Sroufe, "The School Administrator in 1985" by Robert E. Ohm, "Futurist Planning: An Example and Procedures" by Richard C. Lonsdale and Robert E. Ohm, and, as an appendix, "Essential Reading for the Future of Education: A Selected and Critically Annotated Bibliography" by Michael Marien (item 805).

368. Cronbach, Lee J. and Patrick Suppes (eds.). *Research for Tomorrow's Schools: Disciplined Inquiry for Education.* Report on the Committee on Educational Research of the National Academy of Education. N.Y.: Macmillan, 1969. 281 pp.

Although "designed to help the educational community make more effective use of research and scholarship in reshaping and revitalizing educational institutions" this austere volume is far removed from the empassioned proposals listed elsewhere in this bibliography. It is fundamentally important to consider whether the "disciplined inquiry" as proposed here can revitalize education or whether it, ironically, is part of the problem.

369. U.S. Department of Health, Education, and Welfare. *Educational Research and Development in the United States.* Washington: U.S. Government Printing Office 1970. 200 pp. $2.00.

"Explores the development, the present status, and possible lines of future growth of educational research and development." (advt.)

III. HIGHER EDUCATION

A. GENERAL

370. Carnegie Commission on Higher Education.

General Information pamphlet available from The Commission, 1947 Center St., Berkeley, Calif. 94704.

All publications may be ordered from McGraw-Hill Book Co., Hightstown, N.J., 08520.

A monumental endeavor, established in spring 1967 and headed by Clark Kerr, concerned with the functions, structure, and goverance of higher education, innovation and change, demand and expenditures, and effective use of resources. Special Reports "of urgent public interest" have appeared since December 1968. (See the four following items plus items No. 436, 501, 503, 540, and 921.) Topics currently under consideration for future reports involve relationships between the campus and the city, and new educational technology. A recent forecast estimates 20 of these reports before the final report of the Commission is available in June 1972. In addition to the reports, 67 special studies have been commissioned, many of them serving as background material for the reports. The studies published so far (that are considered relevant to this bibliography) may be found by consulting the Index by Organization.

371. Carnegie Commission on Higher Education. *Quality and Equality: (Revised Recommendations) New Levels of Federal Responsibility for Higher Education*. N.Y.: McGraw-Hill, June 1970. 48 pp. $1.95. (Earlier edition published in December 1968.)

The first in a series of special reports, urging more Federal aid to meet two urgent national priorities: greater equality of opportunity and a substantial expansion of health service personnel. Other recommendations concern student aid, construction, research, etc., and the specific advocacy of a National Foundation for the Development of Higher Education and a Council of Advisors on Higher Education (modeled after the Council of Economic Advisors).

372. Carnegie Commission on Higher Education. A *Chance to Learn: An Action Agenda for Equal Opportunity in Higher Education*. A Special Report of the Commission. New York: McGraw-Hill, March 1970. 40 pp. $1.95.

By 1976, it is proposed that all economic barriers to educational opportunity be eliminated, that the curriculum and the environment of the college campus not remain a source of educational disadvantage, and that substantial progress be made toward improvement of educational quality at levels prior to higher education and toward provisions of universal access. "By the year 2000, there should be no barriers to any individual achieving the occupational level which his talent warrants and which his interest leads him to seek." (p. 28)

373. Carnegie Commission on Higher Education. *The Open-Door Colleges: Policies for the Community College*. A Special Report of the Commission. New York: McGraw-Hill, June 1970. 88 pp. $1.95.

Recommends establishing 230–280 new community colleges (added to the 1000+ colleges already in existence), so that, by 1980, a community college will be within commuting distance of 95% of all Americans. The Commission favors the "Comprehensive" community college with an optimum size of 2000–5000 students.

374. Carnegie Commission on Higher Education. *Less Time, More Options: Education Beyond the High School*. A Special Report of the Commission. New York: McGraw-Hill, January 1971. 64 pp. $1.95.

This fifth report in a continuing series of interim statements recommends the shortening of undergraduate education from 4 to 3 years, greatly expanded opportunities for postsecondary education throughout life, and drastically reducing the number of degrees offered from the current 1600 to about 160 broad area degrees that "decrease the now increasing emphasis on narrow certification." (For elaboration, see Spurr, item No. 587) Such reforms would reduce the forecasted enrollment growth by 1980 from 3 million to 2 million, and would save higher education a total of $5 billion in capital construction costs during the 1970's, as well as $3-5 billion a year in operating expenditures. "We should neither overinvest the time of students nor the resources of society in higher education." Recommended.

375. American Academy of Arts and Sciences, Assembly on University Goals and Governance. *A First Report of the Assembly on University Goals and Governance*. Boston: AAAS (280 Newton Street), 1971. Free. Reprinted in *The Chronicle of Higher Education*, V: 15. January 18, 1971.

A blue ribbon panel headed by Martin Meyerson, listing 85 theses to stimulate academic reforms in all areas of higher education, and nine themes pervading the report: learning as the central mission, institutional self-knowledge as a basis for educational reform, extending choice in admissions and attendance, experimentation and flexibility in undergraduate and graduate education, diversification and differentiation, preserving the private and public systems, enhancing the professoriate by broadening the basis of recruitment, governance by delegation and accountability and inventing new procedures and institutional forms to make cooperation and self-help more of a reality. Recommended.

376. President's Task Force on Higher Education. *Priorities in Higher Education.* Washington: U.S. Government Printing Office, 1970. $0.30. (Recommendations published in *The Chronicle of Higher Education*, October 19, 1970, pp. 3–4)

Chaired by James M. Hester, the Task Force makes recommendations on financial aid for disadvantaged students, Negro colleges, support for health-care professional education, increased tax incentives for support to higher education, the expansion of opportunities for posthigh school education, the support of high-quality graduate and professional education, clarification of institutional purposes, improvement in the quality of the curriculum and methods of teaching and learning, clarification of institutional governance, and establishing a National Academy of Higher Education modeled after the National Academy of Sciences. Recommended.

377. Newman, Frank (Task Force Chairman). *Report on Higher Education.* Washington: U.S. Department of Health, Education, and Welfare, March 1971. 140 pp. (Major proposals reprinted in *The Chronicle of Higher Education*, March 15, 1971, pp. 4–8.)

A study group, funded by the Ford Foundation and initiated and endorsed by top officials in the Nixon Administration, challenges the assumptions on which traditional higher education is based. It urges wholly new institutions, equivalency examinations for knowledge acquired outside of classrooms, greater use of educational television for those who do not wish to attend classes, the development of informal tutors from whom persons could obtain academic assistance, and more recruiting of older students to overcome the college's role as a principal cause of the generation gap. The college as an isolated community is criticized for bearing little resemblance to the real world, and it is doubted whether education could be made more relevant to the real world by simply developing new curricula. Recommended.

378. The President's Committee on Education Beyond the High School. *Second Report to the President.* Washington: U.S. Government Printing Office, July 1957. 114 pp.

Originally intended as an interim report similar to the first one (November 1956), funds were cut off and this report serves as a final statement. There are a number of recommendations concerning inputs: the need for teachers, assistance to students, expansion and diversity of educational opportunities, and financing higher education: but there is no concern for the quality of educational services as there is at present. However, there are two remarkable insights that are still relevant for contemporary policymaking: the recognition of peripheral education in corporations, the military, etc., such that "we have become 'a society of students' " (p. 1), and the emphasis on the neglected Federal role in collecting information. "We have been struck above all else by the astounding lack of accurate, consistent, and up-to-date facts, and by how little this Nation knows about its enormously vital and expensive educational enterprise in contrast to how much it knows, in great detail, about agriculture, industry, labor, banking and other areas." (p. 15) Indeed! Recommended.

379. Select Committee on the Future of Private and Independent Higher Education in New York State. *New York State and Private Higher Education.* Report of the Committee. Albany: State Education Department, Bureau of Publications, January 1968. 155 pp.

Chaired by McGeorge Bundy, the Committee was formed in the face of "an immediate financial crisis of disastrous proportions." The 16 recommendations fall in four general classes: direct assistance from New York State to private colleges and universities, the amendment of the State Constitution to facilitate this assistance, a reconfirmation of the existing responsibilities and powers of the Board of Regents (reinforced by strengthening the staff of the State Department of Education), and steps for both private institutions and the Board of Regents "to develop a much stronger base of information and reporting upon which statewide educational decisions can be based."

380. Commission on Post-Secondary Education in Ontario. *Post-Secondary Education in Ontario: A Statement of Issues.* Toronto: Ontario Department of Education (44 Eglinton Avenue West), 1970. 20 pp. Free.

An interim statement by the Wright Commission, briefly outlining issues such as expected number of students, institutional characteristics, costs, the economic argument for education, the manpower argument for education, certification, education and social justice, the example of the U.S., measurements, technology, structural problems, student's share of cost, etc. An excellent overview of essential questions. Recommended.

381. College Entrance Examination Board. *Planning College Policy for the Critical Decade Ahead.* N.Y.: CEEB, College Admissions 5, 1958. 123 pp.

"Considers how colleges should modify their admissions, fiscal, instructional, and other policies to prepare for the increased number of applicants that has been forecast." (CEEB catalog.)

382. Eurich, Alvin C. and the Staff of the Academy for Educational Development. *Campus 1980: The Shape of the Future in American Higher Education.* N.Y.: Delacorte, 1968. 327 pp.

A competent anthology of largely descriptive forecasts by the top writers on higher education, who adhere quite well to the objective of looking at "Campus 1980." Topics include the magnitude of higher education, higher education and the national interest, cities and universities, universities and the world, professionalism, teaching, community colleges, continuing education, college students, curriculum, instructional organization, intructional technology, graduate education, campus architecture, and the university and change. Recommended.

383. Mayhew, Lewis B. (ed.). *Higher Education in the Revolutionary Decades.* Berkeley: McCutchan, 1967. 466 pp.

A reader presenting an excellent selection of 34 arictles, some of which are cited elsewhere in this bibliography. Although many of the articles deal with trends in the revolutionary decades since World War II, the inclusion of several future-oriented articles implies that forthcoming decades will also be revolutionary. Especially see the scenario by Alvin C. Eurich, "A Twenty-First Century Look at Higher Education" (pp. 443–453), in which universities are seen as stressing wisdom rather than fact-mongering, using television lectures by the world's leading scholars, judging students by standardized criteria of achievement rather than time spent in college, employing microfilmed libraries and portable television sets in dormitory rooms, and allowing individual determination of course mixes. (Eurich offers a similar but updated scenario in *Reforming American Education*, Item No. 138.)

384. Margolis, John D. (ed.). *The Campus in the Modern World: Twenty-Five* Essays. N.Y.: Macmillan, 1969. 381 pp.

A worthwhile anthology of reprints and original essays "exploring the fundamental questions of higher education in general" with little concern for contemporary issues except in passing. Part V has six original essays on alternatives by Jacques Maritain, Clark Kerr, Paul Goodman, John Gardner, John Keats, and Michael O'Neil.

385. Caffrey, John (ed.) *The Future Academic Community: Continuity and Change.* Washington: American Council on Education, 1969. 327 pp. $7.00.

Proceedings of the 1968 ACE Annual Meeting, including articles by Bertrand de Jouvenel, Alvin C. Eurich, Constantinos Doxiadis, John Gardner, etc.

386. Henderson, Algo D. (ed.). *Higher Education in Tomorrow's World.* Ann Arbor: University of Michigan, 1968. 189 pp. $3.50.

Proceedings of an international conference held in April 1967, with 23 papers (8 by U.S. authors) considering the university and tomorrow's student, tomorrow's people, tomorrow's nation, and tomorrow's civilization. Most of the papers are prescriptive.

387. Stroup, Thomas B. (ed.). *The University in the American Future.* Lexington: University of Kentucky Press, 1966. 111 pp. $4.00.

Proceedings of the 1965 University of Kentucky centennial conference, with essays by Kenneth D. Benne, Sir Charles Morris, Henry Steele Commager, and Gunnar Myrdal on the theme of "A University, A.D. 2000."

388. Miescher, Peter A., Carlo Henze, and Raeto Schett (eds.). *The Modern University, Structure, Functions, and Its Role in the New Industrial State.* A Symposium, Geneva, October 1968, N.Y.: Intercontinental Medical Books, 1969. 194 pp. Paper, $8.20.

389. Lawrence, Ben, George Weathersby, and Virginia W. Patterson (eds.). *Outputs of Higher Education: Their Identification, Measurement, and Evalua-*

tion. Papers from a seminar held at Washington, D.C., May 3–5, 1970, conducted by the Western Interstate Commission for Higher Education in cooperation with the American Council on Education and the Center for Research and Development in Higher Education at Berkeley. Boulder, Colo.: WICHE, July 1970. 130 pp. $3.50.

Ten important essays examining purposes, priorities, responsibilities and capabilities of higher education, under the rationale that "Educational decision-makers are seeking honest, viable responses to the issues of public accountability, flagging financial support, and an earlier over-reaction to short-term need. They are seeking forthright approaches to the polarization of opinion about the role of the university in a free society ordered by law" (p. 7). Bibliography of about 200 items in three categories: output variables and models for their analysis; goals and/or psycho-social effects of education on its constituencies; and educational costs. Recommended.

390. Minter, W. John and Ian M. Thompson (eds.). *Colleges and Universities as Agents of Social Change.* Berkeley: Center for Research and Development in Higher Education, November 1968. 148 pp. $3.50.

Six articles and a symposium discussion, based on the 10th College Self-Study Institute, held in 1968. Annotated bibliography of about 100 items on higher education and social change.

391. Smith, G. Kerry (ed.). *Stress and Campus Response: Current Issues in Higher Education—1968.* A Publication of the American Association for Higher Education. San Francisco: Jossey-Bass, 1968. 297 pp.

Twenty-five essays in five categories: a society in crisis, students, organization and governance, curricular relevance, and looking toward the future.

392. Kean, Richard (ed.). *Dialogue on Education.* Indianapolis: Boobs-Merrill, 1967. 144 pp.

An outgrowth of the National Conference on Curricular and Instructional Innovation in Large Colleges and Universities, which was wrecked on the rocks of non-communication. Contains eight future-oriented articles by students and faculty.

393. Brewster, Kingman, Don K. Price, Robert C. Wood and Charles Frankel. *Educating for the Twenty-First Century.* Urbana: University of Illinois Press, 1969. 65 pp. $.95.

Four lectures given during the final week celebration of the University of Illinois Centennial Year, March 1968. The Future of Formal Education, Science and Technology in a Democratic Society—Educating for the Scientific Age, The Competent City, and The Future University: Tool or Maker of Foreign Policy, by Brewster, Price, Wood and Frankel respectively. Although the lectures are competent and provocative, none of the authors attempt to discuss the twenty-first century to any degree whatsoever—still another example of convocational rhetoric.

394. Morison, Robert S. (ed.). *The Contemporary University: U.S.A.* Boston: Houghton-Mifflin, 1966. 364 pp.

Revised Fall 1964 issue of *Daedalus.*

395. Potter, P., and R. Leeds (eds.). *Aims of Education.* Washington: National Student Association, 1962. 73 pp.

A selection of general readings, some of which include Alternatives for American Education. This may well be one of the earliest publications entertaining the notion of alternatives.

396. Hodgetts, John Edwin (ed.). *Higher Education in a Changing Canada.* Toronto: University of Toronto Press, 1966. 90 pp.

A nine-paper symposium presented to the Royal Society of Canada in 1965. Especially see the first chapter on trends and prospects in higher education.

397. Harris, Robin S. (ed.). *Changing Patterns of Higher Education in Canada.* Toronto: University of Toronto Press, 1966. 106 pp. $3.50.

Four articles focused on change in various geographic regions.

398. Kerr, Clark. *The Uses of the University.* Cambridge: Harvard University Press, The Godkin Lectures, 1963. 140 pp.

Although primarily known for introducing the concept of the multiversity, there is also a provocative chapter entitled "The Future of the City of Intellect." Planners might well contemplate the statement (p. 102) that "Change comes more through spawning the new than reforming the old."

399. Green, Thomas F., "Post-Secondary Education: 1970–1990" in *Dilemmas in American Policy: Crucial Issues of Contemporary Society*. Syracuse: Syracuse University Publications in Continuing Education, No. 62. Nov. 1969, pp. 59–84. (Free reprints available from Educational Policy Research Center at Syracuse.)

A discussion of the post-secondary system including the entire range of on-the-job training, adult education, museums, art centers, and technical institutes as well as colleges and universities. In contrast to today's closed system of rigorous credentialism, "extended professionalism," and specialization, a scenario is offered (centered around a university president in 1988) of a new system unbound by sterile qualifications for students or staff, and unrestricted in its offerings by status or place. Recommended.

400. Wolff, Robert Paul. *The Ideal of the University*. Boston: Beacon Press, 1969. 161 pp. $5.95.

A well-written essay responding to the events at Columbia and attempting to develop a program of practical reform of present-day institutions, based on the view that "the competition for scarce places at top colleges corrupts the secondary school education, and even corrodes primary education as well." After a discussion of four models (the university as A Sanctuary of Scholarship, A Training Camp for the Professions, A Social Service Station, and An Assembly Line for Establishment Man), the final chapter proposes that "performance in high school must be made irrelevant to college admission and college performance must be made irrelevant to graduate and professional admission." (p. 142) Degrees would be abolished, including the Ph. D. and its questionable "contribution-to-knowledge" requirement, in turn freeing students for truly meaningful work. Professional training would be an alternative to undergraduate education, rather than a linear sequel to it, and undergraduate admissions would be by lot among those attaining some minimum performance.

401. Sanford, Nevitt. *Where Colleges Fail: A Study of the Student as a Person*. San Francisco: Jossey-Bass, 1967. 229 pp.

The editor of the classic *The American College* aims "to help restore the student to his rightful place at the center of the college's activities," stating the case for individual development as the primary aim of education, and presenting a theory of how students actually develop. Advocates a "total educational environment" to be guided by a theory of personality. Recommended.

402. Axelrod, Joseph, et al. *Search for Relevance: The Campus in Crisis*. San Francisco: Jossey-Bass, 1969. 244 pp. Bib., pp. 212–237.

Tying together Nevitt Sanford's theory of student development, old ideals, and present student protest, four "total design" models are proposed: a cluster college on the campus of an urban college or university, a B.A. program in Future Studies, a community college, and an Experimental Freshman Year Program. Bibliography of about 400 items. Recommended.

403. Henderson, Algo D. *The Innovative Spirit*. San Francisco: Jossey-Bass, 1970. $8.75.

Outlines proposals for reform on issues such as curriculum change, student-faculty-administration relationships, governance, restructuring of professional schools, faculty loyalty, and new forms for colleges.

404. Katz, Joseph, and Associates. *No Time For Youth*. San Francisco: Jossey-Bass, 1970. 463 pp.

A sympathetic investigation of the undergraduate student, based on interviews with 3,500 freshmen and 200 follow-up interviews during the next four years of college life. Concludes with a recommendation for education oriented to individual development.

405. The Committee on the Student in Higher Education. *The Student in Higher Education*. New Haven, Conn.: The Hazen Foundation, January 1968. 66 pp.

"This report was written to bring attention to the possibility of developmental higher education . . . These recommendations call for a major qualitative change in planning for the future of higher education. The Committee has no quarrel with the computer experts, the technical planners, and the budgetary wizards who are telling us how many students, teachers, and classrooms we will need by 1980 . . . but it is not enough, for they are not concerned with the character of education. It takes another kind of planner to consider and envision the quality of human relationships in the college environment." (p. 57). Many recommendations such as the whole freshman year as an orientation to learning, a reduction of competition, a proliferation of experimentation, a reforming of physical structures, etc. Clearly written with a humane concern. Recommended.

406. **Minter, John W. (ed).** ***The Individual and the System: Personalizing Higher Education.*** **Berkeley: Western Interstate Commission for Higher Education and the Center for Research and Development in Higher Education, 1969. 187 pp. Bib.**

Stemming from a 1967 College Self-Study Institute. Includes a 50-page annotated bibliography.

407. Barzun, Jacques. *The American University: How It Runs, Where It Is Going.* New York: Harper & Row, 1968; Harper Colophon edition, 1970. 319 pp. $2.45 paper.

Barzun is a well-established commentator on American education, as indicated in the Appendix D checklist of 144 writings and speeches on educational subjects, 1926–67 (pp. 295–302). In this rambling but pungent overview. "The New University" that has emerged in the past 20 years is generally viewed with dispair. Subsequent chapters discuss Scholars in Orbit; Students or Victims?; Administrators Above and Below; Friends, Donors, Enemies; Poverty in the Midst of Plenty; and The Higher Bankruptcy—all based on Barzun's extensive experience as academic dean at Columbia. The final chapter, "The Choice Ahead," offers an "incomplete string of (68) imperfect suggestions "based on the premise "that the nation wants a university in the honorific and not in the service-station sense," and that it does not wish a proletarian culture where the prevailing tendency is to suspect height. The suggestions are often difficult to fathom (in contrast to the neat arrays of public commissions), but in general Barzun apears to advocate an enlightened conservative retrenching along the lines of simplification, sobriety, being choosy about new projects, reconsidering research, reducing the fever of mandarinism, a charter of the rights and duties of universities, and cutting down on studies and conferences. To crack the Ph. D., it is suggested that every native-born American be given one at birth; pending this, an interim measure is offered of awarding the Ph.D immediately after orals (pp. 261–262). Although an Ombudsman is recommended as an outlet for grievances, the university is not a political unit and therefore is not a democracy." (p. 266). Given current dispositions, it is doubtful that, in general, the university will be going where Barzun wishes it to go.

408. Martin, Warren Bryan. *Alternative to Irrelevance: A Strategy for Reform in Higher Education.* Nashville: Abingdon Press, 1968. 160 pp.

The essays in this book are influenced by two assumptions. The first one is that learning in the 21st century will take place under arrangements so radically different from present educational forms that the ways we do things now are not likely to have much transfer value then. The second assumption is that the content of educational programs in the furture will be changed no less radically than the forms; indeed, changed to such an extent that what we teach today may be regarded by educators in the next century as negative precedents—examples of what not to do (p. 9). Responding to these assumptions, Martin advocates alternative models within the existing system, and the cluster college concept of small colleges within large universities is considered to be the best mechanism known for testing divergent models.

409. **Woodring, Paul.** ***The Higher Learning in America: A Reassessment.*** New York: McGraw-Hill, 1968. 236 pp.

A provocative critique by the former education editor of the Saturday Review. See Part IV, "Problems and Proposal," especially chapter 15 "Problems for Long-Range Planners," and "A Reform Plan for Higher Education" (p. 216). Some useful ideas, in addition to a bleak forecast of declining enrollments (pp. 169–173, based on the traditional estimate of high school graduates, rather than learning needs of the entire population.

410. **Etzioni, Amitai.** ***Towards Higher Education in an Active Society: Three Policy Guidelines.*** New York: Center for Policy Research (423 W. 11th St.), 1970. $3.75.

suggests changes to tie higher education more closely to meaningful national projects and to make the system more effective in leading toward a person-centered society.

411. Bowles, Frank, "American Higher Education in 1990," *Minerva*, 5:2, Winter 1967, pp. 227–241.

Focuses on the long-range tendency to extend universal education to older age groups and the tendency to bring all forms of post-secondary education under university control. Some of the unsurprising forecasts for 1990: Universal preschool education, urban universities directly involved with urban schools, 30–40 percent of an age cohort obtaining college degrees, corporations operating accredited institutions of higher education in specialized fields, and a federal department of research and education headed by a cabinet officer. It is questionable, however, whether "education will have lost importance as a major political issue." (p. 241)

412. Nisbet, Robert, *The Degradation of the Academic Dogma: The University in America, 1945–1970*. New York: Basic Books, February 1971. $6.95.

Accuses the universities of having betrayed themselves by abandoning their commitment to the pursuit of knowledge for its own sake, leading to their demise as centers of learning. A program of reforms is offered for regaining a sense of community and a clear definition of the university's distinction contribution to society.

413. Mann, Richard D., et. al. *The College Classrooms: Conflict, Change, and Learning*. New York: Wiley, 1970. 390 pp. $9.95.

414. Taylor, Harold. *Students Without Teachers: The Crisis in the University*. New York: McGraw-Hill, 1969. 333 pp.

415. ——— *How to Change Colleges: Notes on Radical Reform*. New York: Holt, New York: Holt, Rinehart Winson, March 1971, $4.95: $2.45 paper.

416. Stein, Maurice and Larry Miller. *Blueprint for Counter Education*, New York: Doubleday, 1970. (unpaged)

Three charts and a book in a box.

417. Freedman, Morris. *Chaos in Our Colleges*, New York: David McKay, 1963. 241 pp.

An astute, sympathetic, and engaging essay by an English professor, based on the premise that "American higher education does not know where it is going, does not even know where it wants to go . . ." (p. 9). Manners and mores of academia are explored, with the concluding chapter "The Future Landscape" providing an interesting and optimistic view of emerging patterns.

418. Ackoff, Russell L. *Toward an Idealized University*. Philadelphia: Wharton School of Finance, Management Science Center, July 1968. Fourth version. 25 pp. Mimeo.

A concise, imaginative model of the university as an integrated system.

419. McConnell, T. R. *A General Pattern for American Public Higher Education*. New York: McGraw-Hill. The Carnegie Series in American Education, 1962, 198 pp.

Explores "the pattern of institutions through which a state may provide for the higher education of its heterogeneous student population and for the diverse demands which the American people make on their colleges and universities."

420. Perkins, James A. *The University in Transition*. Princeton University Press, 1966. 90 pp.

Three provocative lectures concerning the dynamics of university growth, the search for internal coherence, and the trend from autonomy to systems.

421. Jencks, Christopher and David Riesman. *The Academic Revolution*. Garden den City: Doubleday, 1968. 580 pp. $10.00.

An authoritative overview focusing on the growth of professionalism and the consequent emergence of the "university college" as "the model for the future." Recent dissent and subsequent change, however, may make this thorough volume somewhat obsolete in the next few years. Although largely empirical, the final chapter is devoted to "Reforming the Graduate Schools," a concern that is largely overlooked in the many volumes devoted to undergraduate educations. RECOMMENDED

422. HODGKINSON, HAROLD L. *Institutions in Transition*. Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, August 1970.

A study based primarily on a questionnaire completed in 1968–69 by the presidents of about half of the nation's institutions of higher learning. The major findings indicate a widespread movement for institutions to offer ever more advanced degrees, a greater openness to middle-class minority youths than to lower-class youths of any race, no major differences between instituions in different regions, a growing homogenization of higher education, size of institution as the chief determinant of differences, and increased faculty and student control over institutional affairs. Recommended

423. Wilson, Logan (ed.). *Emerging Patterns in American Higher Education.* Washington: American Council on Education, 1965. 292 pp.

The 37 papers examine the changing environment of higher education, the institutional modifications that result, the emergence of state systems and voluntary arrangements among institutions, and the more formal interinstitutional and interstate agreements. Readers concerned with planning for the future will find useful guidelines in the critical evaluations of these developments. (ACE Publications Catalog)

425. Smith, Bardwell L., "Educational Trends and the Seventies," *AAUP Bulletin*, Summer 1970, pp. 130–136.

Discusses new types of clientele, the decline of separatism, shifts in time and place of the educational enterprise, changing patterns of authority, broadening patterns of support, and new modes of learning.

425. Wrenn, C. Gilbert, "Projections of Change and their Impact on College Education," *Liberal Education*, 54. December 1968, pp. 601–609.

A good essay, commenting on eight societal and value changes and then discussing eight impacts on higher education.

426. Keeton, Morris and Conrad Hilberry. *Struggle and Promise: A Future for Colleges.* N.Y.: McGraw-Hill, Carnegie Series in Education. 1969. 444 pp.

Profiles of trends in twelve liberal arts colleges.

427. Brick, Michael and Earl J. McGrath. *Innovation in Liberal Arts Colleges.* N.Y.: Teachers College Press, Published for the Institute of Higher Education, 1969. 173 pp.

An undated survey (presumably 1967 or 1968) of 1209 liberal arts colleges with a 73.0% usable response. Innovations in various curriculum practices, instructional methods, student governance arrangements and organizational practices are tabulated as existing before 1961, 1961 and after, or planning to introduce. Many individual examples are described. Unfortuntely, the data is superficial, with no analysis as to the degree of the innovation (e.g., how many students take how many interdisciplinary courses with what degree of satisfaction), and which classes of institutions (by size, location, and affiliation) are the most innovative. An image of progress and rational adaptation is fostered, only to be shattered by student dissatisfaction with oncampus learning conditions.

428. Baskin, Samuel (ed.). *Higher Education: Some Newer Developments.* (Sponsored by The Association for Higher Education, NEA.) N.Y.: McGraw-Hill, 1965. 342 pp.

14 articles on new colleges, curriculum, independent study, study abroad, superior student programs, new media, facilities, the community as a resource, year-round calendars, consortia, and financing.

429. Willingham, Warren W. *Free-Access Higher Education.* N.Y.: College Entrance Examination Board, 1970. 252 pp. $6.50.

"Of 2,596 institutions in the fall of 1968, only 789 were found to be sufficiently nonselective and inexpensive to meet the study's definition of 'free-access' colleges. The definition encompassed colleges that accepted all or most high school graduates and charged no more than $400 a year in tuition and fees. Only 42 percent of the country's population lived within reasonable commuting distance of such institutions . . . The study found a 'serious deficiency' of accessible institutions in 23 of the 29 largest metropolitan areas in the country. It showed that there were no free-access colleges in the principal cities of 102 metropolitan areas." (*Chronicle of Higher Education*, October 19, 1970, p. 5)

430. McGrath, Earl J. (ed.). *Universal Higher Education.* N.Y.: McGraw-Hill, 1965. 258 pp. $5.95.

Report of a conference held under the auspices of the Institute of Higher Education at Teacher's College, Columbia, November 1964, presenting predictions on the forms and purposes of U.S. higher education in the next decade.

431. Medsker, Leland L. and Dale Tillery. ***Breaking the Access Barrier: A Profile of the Two-Year Colleges.*** Prepared for the Carnegie Commission on Higher Education, N.Y.: McGraw-Hill, May 1971. 194 pp. $5.95.

432. Ashby, Sir Eric. ***Any Person, Any Study: An Essay on American Higher Education.*** Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, May 1971. 144 pp. $4.95.

433. Center for Policy Research. ***Post-Secondary Education and the Disadvantaged.*** N.Y.: Center for Policy Research (423 W. 118th St.), 1970. $3.00.
Advocates three constructive responses: black studies, compensatory education, and open enrollment. Of the three, open enrollment is seen as yielding the greatest long-term benefit to black students and the black community.

B. GOVERNANCE

434. National Commission on the Causes and Prevention of Violence. ***To Establish Justice, To Insure Domestic Tranquility.*** Final Report. Washington: USGPO, December 1969. 338 pp. $1.50.
Especially see Chapter 9 on campus disorder, which recommends a code of conduct for student-faculty-administration relations, contingency plans for dealing with campus disorders, more rapid and effective decision-making, better communications both on the campus and with alumni and the general public, caution against reactive legislation, and a focus on "striving toward the goals of human life that all of us share and that young people admire and respect." (p. 281) Chapter 10, on "Challenging Our Youth," recommends a lowering of the voting age, draft reform, expanded programs of public service and opportunities for inner-city youth, more research on marijuana use, lowered penalties for use and possession of marijuana, and better communication to bridge the generation gap. Recommended

435. ***The Report of the President's Commission on Campus Unrest. Including Special Reports: The Killings at Jackson State; The Kent State Tragedy.*** N.Y.: Arno, 1970. 529 pp. $5.95. (Report also appearing in *The Chronicle of Higher Education*, V:2, October 5, 1970, pp. 2–24)
The Scranton Commission report on "a crisis of violence and understanding," finding that most student protesters are neither violent nor extremist. Many recommendations for law enforcement agencies, the President, governments, universities, and students. Recommended

436. Carnegie Commission on Higher Education. ***Dissent and Disruption: Proposals for Consideration by the Campus.*** A Special Report of the Commission. N.Y.: McGraw-Hill, April 1971. Text also appears in *The Chronicle of Higher Education*, March 15, 1971, pp. 11–14.
The Carnegie Commission "generally endorses" the report of the President's Commission on Campus Unrest (the Scranton Commission) and recommends that "Evaluation of and response to events on a campus be based upon the distinction between dissent and disruption." A model "Bill of Rights and Responsibilities for Members of the Institution" is proposed for adoption by all campuses. Recommended

437. Keniston, Kenneth and Michael Lerner. "The Unholy Alliance Against the Campus," *The New York Times Magazine*, November 8, 1970, pp. 28–29, 56–86.
A hard-nosed overview of student protest data in support of the assertion that both the extremist right and the extremist left "are allied in blaming the campuses for unrest." The authors point out that the absolute number of protests have not increased dramatically in the past six years, although the number of protests concerned with off-campus issues has increased sharply; each side uses distorted charges of "police brutality" or "student violence" to recruit new supporters; faculty support or leader ship of disruptive and violent protests was extremely rare; the major extremist charges against the university—improper discipline, indoctrination, and politicization—are all false; there are fewer protests per 10,000 students at large institutions than at small ones; only 4% of college seniors judge higher education as "basically unsound," although there is no relationship between a student's educational dissatisfaction and his involvement in protests; campus characteristics have a negligible effect on student protest.

"We conclude that most political discussions of campus unrest bear almost no relationship to the known facts. They are a mixture of misinformation, innuendo, stereotyping and falsification." (p. 83) Recommended

438. *Confrontation: A Newsletter from The Lemberg Center for the Study of Violence.* Special Issue on "Explanations of Student Unrest." Waltham, Mass.: Brandeis University, April 1970. 23 pp. Free.

A scholarly survey of the literature, as concerns participants, issues and goals, processes, and outcomes. The area of concern, however, is limited to colleges and does not cover high school protests. A bibliography and a summary of field research and case studies cites about 70 items on student dissent and violence—the most extensive bibliography for this area that is known to this compiler.

439. Schwartz, Edward (ed.). *Student Power: Philosophy, Program, Tactics.* Washington: National Student Association, 1968. 410 pp.

Provides different models for student participation in institutional policy formation.

440. Farber, Jerry. *The Student as Nigger: Essays and Stories.* New York: Contact Books, August 1969; Pocket Books, September 1970. 142 pp. $.95.

The pungent title essay of this policy manual for institutional clients is already an underground classic, having appeared (by Farber's estimate) in about 500 publications. But far more is offered here. "The Student and Society: An annotated Manifesto" begins with the assertion that "School is where you let the dying society put its trip on you . . . it's not what you're taught that does the harm but how you're taught. Our schools teach you by pushing you around, by stealing your will and your sense of power . . . Students can change things if they want to because they have the power to say 'no'." (p. 17)

In "The Four-Fold Path to Student Liberation," Farber advocates The Way of Direct Action (non-violent), The Way of the Provo (not always practical but always aesthetic), The Way of the Square (student government) and The Way of the Self ("When people stop playing 'student,' they will be able to learn without surrendering themselves in exchange.") Also see "A Young Person's Guide to The Grading System" and a brilliant satire of academic behaviorists: "Teaching Johnny to Walk: An Ambulation Instruction Program for the Normal Preschool Child."

Whether or not one is sympathetic, educators should recognize that volumes such as this are increasingly influential in shaping educational policy. Recommended

441. American Civil Liberties Union. *Academic Freedom and Civil Liberties of Students in Colleges and Universities.* New York: ACLU (156 Fifth Ave., New York, N.Y. 10010), 1970. 48 pp.

Advocates that students should be allowed to participate in "an effective capacity" in deciding policy on all matters affecting their education and student life. Provides guidelines for student rights on such subjects as freedom in the classroom, publications, personal freedom, discipline, and records.

442. Bell, Daniel. "Quo Warranto?—Notes on the Governance of Universities in the 1970's," *The Public Interest*, No. 19, Spring 1970, pp. 53–68.

A discussion of governance in the context of an assortment of observations on Vietnam, the blacks, the multiplication of social problems, the post-industrial society, and "the new sensibility" of anti-instiutionalism and anti-intellectualism.

443. Brickman, William W. and Stanley Lehrer (eds.). *Conflict and Change on the Campus: The Response to Student Hyperactivism.* N.Y.: School and Society Books, 1970. 528 pp. $9.75.

Analyzes causes of U.S. and foreign student unrest and offers proposals for solutions.

444. Caffrey, John. "Letter from Tomorrow." *AAUP Bulletin*. 54:3, September 1968, pp. 323–324.

An anti-utopian scenario, seen through the eyes of a foreigner on May Day 1978. American universities utilize a tight system of security, with badges, television surveillance of classrooms, and automatic controls to seal classroom doors and flood the rooms with violence-inhibiting chemical sprays. With the disappearance of authority, students and faculty dress, speak, and think alike. Disputes over "truth" and the granting of degrees are determined by student vote. Admission is by ethnic quota, with proportionate representation of all social classes.

445. Dietze, Gottfried. *Youth, University, and Democracy.* Baltimore: Johns Hopkins, 1970. $6.50.

Holds that universities have failed in their responsibility to foster an objective search for truth through scholarship, and appeals to faculties and administrators to reassert their capacities for creative leadership.

446. Dobbins, Charles G. and Calvin B. T. Lee. *Whose Goals for American Higher Education?* Washington: American Council on Education, 1968. 241 pp.

Brings together the views of the main constituencies of American colleges and universities—students, faculty, administrators, trustees, and public leaders . . . each giving different answres to the questions, Whose goals? Which goals? And how may they best be achieved? . . . Addressed to all who are concerned with the direction and purpose of higher education. (ACE catalog).

447. *The Embattled University. Daedalus,* 99:1, Winter 1970.

448. Fisk, Winston M., "A System of Law for the Campus: Some Reflections," *The George Washington Law Review,* 38:4, May 1970, pp. 1006–1025.

449. Habermas, Jurgen. *Toward a Rational Society: Student Protest, Science, and Politics.* Translated by Jeremy J. Shapiro. Boston: Beacon, 1970. $5.95.

450. Hersey, John. *Letter to the Alumni.* N.Y.: Knopf, October 1970; Bantam, February 1971. 179 pp. $1.25 paper.

A brief and simply-written essay by a well-known novelist based on his experience as Master of Pierson College at Yale, especially during the 1970 May Day events in New Haven. After surveying these events, in the context of broader academic and social issues, a choice of two futures is presented. The first—Amercian Repression—"is the easy future to reach. All we have to do is keep on going the way we are now." The other and tolerable future will be based on two essential elements of an atmosphere of trust and decentralization of power, a revolution of non-violence that will not just happen but will have to be achieved.

451. Horowitz, Irving Louis and William H. Friedland. *The Knowledge Factory: Student Power and Academic Politics in America.* Chicago: Aldine, 1970. 354 pp. $9.75.

452. Howard, John A. and H. Bruce Franklin. *Who Should Run the Universities?* Washington: American Enterprise Institute for Public Policy Research (1200 17th St.), 1971. $5.75

Part of the Rational Debate Seminars, containing views of the two spokesmen, their rebuttals, and their discussions with a seminar of informed experts, including the press.

453. Keeton, Morris. *Shared Authority on Campus.* Washington: American Association for Higher Education (One Dupont Circle), March 1971. $3.75.

Analyzes governance on 19 campuses and recommends approaches for increased effectiveness.

454. Kruytbosch, Carlos E. and Sheldon L. Messinger (eds.). *The State of the University: Authority and Change.* Beverly Hills: Sage Publications, 1970. 379 pp. $10.00; $4.50 paper.

"The papers collected in this volume share a concern with the problem of authority in the university—its changing bases, uses, emergent forms, and prospects. On the one hand, the relationship of the university to society is changing; on the other hand, the internal constitution is also changing. The main question is: 'Can a form of authority be found which will at once accommodate these changes and insure the freedom essential to teachings, learnings, innovation, and communication?' The authors offer no easy answers."

455. Leonard, George B., "Beyond Campus Chaos: A Bold Plan for Peace," *Look,* 33: June 10, 1969. pp. 73+

456. Mayhew, Lewis B. *Arrogance on Campus.* San Francisco: Jossey-Bass, 1970. $7.50.

Charges that students, faculty, administrators, and trustees have all acted arrogantly and without due concern for the rights of others. Advocates curriculum changes to meet development needs of students, a division of power wherever there is a legitimate area of concern, a new academic morality, and avoiding blindly punitive reactions.

457. McGrath, Farl J. *Should Students Share Power? A Study of Their Role in College and University Governance.* Philadelphia: Temple University Press, 1970. $2.45 paper.

    A consideration of the ways in which students can be admitted to a responsible share of power.

458. Miles, Michael. *The Radical Probe: The Logic of Student Rebellion.* New York: Atheneum, March 1971. $7.95.

    Analyzes the background and origins of the student movement, as well as the dynamics of the recurrent campus revolts.

459. Minter, W. John and Patricia O. Snyder (eds.). *Value Change and Power Conflict in Higher Educaiton.* Berkeley: Center for Research and Development in Higher Education, 1969. 128 pp.

460. Morison, Robert S. *Students and Decision-Making.* Washington: Public Affairs Press, 1970. 136 pp. $2.00 paper.

461. Nichols, David C. (ed.). *Perspective on Campus Tensions.* Washington: American Council on Education, 1970. $3.50.

    Papers commissioned by the ACE Special Committee on Campus Tensions, discussing the present situation and the positions of students, faculty, administrators, and trustees, with suggestions for reducing discontent. (*The Chronicle of Higher Education*)

462. Otten, C. Michael. *University Authority and the Student: The Berkeley Experience.* Berkeley: University of California Press, 1971. 222 pp. $7.50.

    The author shows that the crisis of university authority is just one manifestation of a deep-rooted rebellion against administrative centralization. He argues that organizational power must be democratized if conflict is not to become endemic. (advt.)

463. Pentony, DeVere, Robert Smith, and Axen. *Unfinished Rebellions.* San Francisco: Jossey-Bass, Mar. 1971. $9.50.

    Analyzes educational reform, radicalism, racism and reaction, campus discipline and student rights, faculty rights and obligations, police on campus, and the place of the university in society—issues that must be faced during the seventies.

464. Vaccaro, Louis C. and James T. Covert. *Student Freedom in American Higher Education.* New York: Teacher's College Press, 1969.

    Essays dealing with campus governance.

465. Wallerstein, Immanuel. *University in Turmoil: The Politics of Change.* N.Y.: Atheneum, 1969. 147 pp. $4.95.

    A deep, astute, and elegant essay by a political sociologist. "Three questions about the university in society have come to the fore—none of them new but all posed with renewed urgency and simultaneously. One question is the degree to which it is appropriate for the university . . . to collaborate with the government. The second question is the degree to which it is appropriate for the university to attach some priority to the needs and concerns of the oppressed groups within the society. The third question is how the university may itself best be governed. . . ." (p. 9)

    "However it acts in relation to the government, the university is engaged in politics." (p. 11) Changing university linkages to government is seen as having relatively little impact on external policy, but changing university policies in view of their growing roles both as a mechanism for distributing social status and as urban property owners is seen as having a profound impact on society. Finally, overt clashes with the ethnic left and the ideological left are seen as part of a long-range trend to libertarian and participation values. "We are at the early stage of this conflict, the stage of initial testing of strength." (p. 133) This, in turn, will evolve to a stage of constitution-drafting, "perhaps for thirty years or so. (p. 129)

    "Thus reform of curricula is not a primary issue. It will come about almost automatically as a consequence of the other changes we have been discussing, and it will not come in any significant measure without them." (p. 146) Recommended

466. Wallerstein, Immanuel and Paul Starr (eds.). *The University Crisis Reader. Vol. I: The Liberal University Under Attack. Vol. II: Confrontation and Counterattack.* N.Y.: Random House, February 1971. $10.00 each; $2.45 each in Vintage paperback.

467. Wilhelmsen, Frederick (ed.). *Seeds of Anarchy: A Study of Campus Revolution.* Dallas, Texas: Argus Academic Press, 1970. 128 pp.

A symposium of nine conservatives, viewing the breakdown in traditional values, "The New Totalitarians," etc.

468. Rourke, Francis E. and Glenn E. Brooks. *The Managerial Revolution in Higher Education.* Baltimore: Johns Hopkins, 1966. 184 pp.

A thorough analysis, based on questionnaires and interviews, that estimates the degree to which more rationalized college and university administration has taken place, as regards use of EDP equipment, offices of institutional research, and allocation of resources. Several of the conclusions are that the potential of computers is still largely unrealized, institutional self-study will become increasingly common and varied, and that there is an "unmistakable" trend toward more rational procedures in the management of money and space. The emerging style of university administration is toward greater candor, a cabinet style of governing, and new forms of decision-making. One of the great unresolved questions is whether the new managerial techniques lead to a centralization of power. Recommended

469. Phillips, Ellis L. *A New Approach to Academic Administration: The Phillips Program of Internships.* N.Y.: Columbia University, Teacher's College Press, 1969.

"This book covers the major current problems of college and university administration in the United States and discusses . . . existing and proposed efforts to identify and prepare future leaders of the academic world." (advt.)

470. Burns, Gerald P. *Trustees in Higher Education: Their Functions and Coordination.* Independent College Funds of America, Inc., 1966. 194 pp.

A simply-written how-to-do-it book for trustees, with the final chapters, "The Future of the Trusteeship" and "The Future of Higher Education" summarizing various trends.

471. Eulau, Heinz and Harold Quinley. *State Officials and Higher Education: A Survey of the Opinions and Expectations of Policy-Makers in Nine States.* Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, March 1970. 224 pp. $6.95.

C. GENERAL CURRICULUM

472. Dressel, Paul L. and Frances H. DeLisle. *Undergraduate Curriculum Trends.* Washington: American Council on Education, 1969. 83 pp. $2.00.

A thorough analysis of change in the 1957–1967 period, as indicated by the course catalogs of 322 institutions representative of types, control, size, and location.

The trends substantiated by this study are not great in number and less extensive in nature than one might have expected considering the curricular ferment of the past decade. There are definite trends toward the reduction in specific requirements in particular subjects, but the overall pattern of general and concentration requirements has changed but slightly. The result is that students have some increased degree of flexibility in how they fulfill requirements. To some limited extent, mathematics and the natural sciences have assumed a strronger position in the curriculum." (p. 74)

"The most marked curricular changes are in those aspects which have been labeled as individualization: study abroad, work study, community service, honors, independent study, comprehensive examinations . . . However, this approach (studying catalogs) provides no indication of the specific nature, quality, or number of student involved in these programs . . . Careful reading raises doubts that these features have really been integrated into the total program, however, and this brings forward again the point that most of what passes as innovation is really not new." (pp. 75–76)

473. College Entrance Examination Board. *The Challenge of Curricular Change.* N.Y.: CEEB, 1966. 181 pp.

"Explores, defines, and makes recommendatons about the nature of recent curricular reforms in the secondary schools, the responses of the colleges, the effects on students, and the challenges for the future." (CEEB catalog) 17 papers, including "Training Responsible Citizens: The Unfinished Agenda" by Stephen K. Bailey.

474. Schwab, Joseph J. *College Curriculum and Student Protest.* Chicago: University of Chicago Press, 1969. 303 pp.

"A distinguished educator asserts that protest is a symptom and the disease is the curriculum. This diagnosis proceeds to specific prescriptions for cure . . . shows how curriculum must be redesigned to teach the principles of thought and practical choices and to allow undergraduates to become truly part of the intellectual community from which they are at present alienated." (advt.)

475. Snyder, Benson R., M.D. *The Hidden Curriculum.* N.Y.: Knopf, 1971. $5.95.

A psychiatrist's analysis of a major cause of student unrest in higher education.

476. Mayhew, Lewis B. *Contemporary College Students and the Curriculum.* Atlanta: Southern Regional Education Board, 1969. 86 pp.

Proposes that student unrest stems largely from an inadequate curriculum, and advocates wider and more flexible learning experiences.

477. Epstein, Herman T. *The Strategy for Education,* N.Y.: Oxford University Press, 1970. 136 pp. $4.95.

Proposes a new research method of teaching—a technique already employed in a dozen major universities in three countries. "By encouraging students to re-create intellectually the course of research in various fields, it vividly communicates the excitement of discovery." (advt.)

478. Litt, Edgar. *The Public Vocational University: Captive Knowledge and Public Power.* N.Y.: Holt, Rinehart, and Winston, 1969. 159 pp. $3.95, paper.

Views higher education as a "captive domain" gathering vocational knowledge for political ends, and advocates a genuine liberal arts curriculum with emphasis on the humanities and social sciences, and on human development ends.

479. Faust, C. H. and J. Feingold (eds.). *Approaches to Education for Character: Strategies for Change in Higher Education.* N.Y.: Columbia University Press, July 1969.

480. Becker, Ernest. *Beyond Alienation: A Philosophy of Education for the Crisis of Democracy.* N.Y.: George Braziller, 1969.

"Due to the unprecedented rapidity of social change and concomitant fragmentation, man has lost his sense of wholeness and meaning: his creativity and freedom are today constricted at every level." Applied to the core college curriculum the author advocates "a unified view of man based on the authentic insights of the Enlightenment and reinforced by all that psychology, psychiatry, sociology, anthropology, and theology have discovered about man in modern times." (book club advt.).

481. Bell, Daniel. *The Reforming of General Education: The Columbia College Experience in its National Setting.* N.Y.: Columbia University Press, 1966. 320 pp.

Many policy recommendations based on a conscious consideration of the future.

482. Smith, R. I. (ed.). *Men and Societies: Experimental Courses in the Humanities and Social Sciences in Schools, Colleges, and Universities in Great Britain and the United States.* N.Y.: Humanities Press, November 1969.

483. Tussman, Joseph. *Experiment at Berkeley.* N.Y.: Oxford University Press, 1969. 139 pp.

A brief discussion of The Experimental Program which "was conceived as an attempt to reincarnate the spirit and principles of Meiklejohn's Experimental College at the University of Wisconsin in the 1920's. The Berkeley program features a mandatory two-year curriculum largely involved with in-depth study of classics as an approach to "fundamental human problems."

484. Hatch, Winslow R. *The Experimental College.* Washington: U.S. Office of Education, New Dimensions in Education, No. 3, 1960. 13 pp. OE–50010.

"A survey of experimental programs making use of independent study and other new approaches to education." (USOE Publications Catalog)."

485. Morris, William H. (ed.). *Effective College Teachers: The Quest for Relevance.* Published for the American Association for Higher Education by the American Council on Education, Washington: ACE, 1970. 162 pp. $3.50, paper.

486. Runkel, Philip,, Roger Harrison, and Margaret Runkel (eds.). *The Changing College Classroom.* San Francisco: Jossey-Bass, October 1969. 368 pp. $9.50.

"Original reports of innovations in college teaching written for this book by . . . college teachers who describe their work in experimental colleges in state universities, liberal arts colleges, urban colleges, private religious colleges, junior colleges, and Negro college . . . The classes discussed range in size from a dozen to well over a thousand students. The subjects range from mathematics, speech, and writing to psychology, organizational management, and creativity . . . A commonality of goals and an underlying theory unite the underlying practices and experiments: increasing the relevance of education to meet the values and needs of students and increasing the students' freedom, self-direction, and learning-how-to-learn (advt.)." Recommended.

487. Arrowsmith, William "The Future of Teaching." *The Public Interest,* No. 6, Winter 1967, pp. 53–67.

A well-known scholar in the humanities decries the decline of scholarship to professional and technocratic forms at the expense of learning, and advocates "a new professoriate of such power that it can challenge the supremacy of the research department." (p. 65)

488. Kirk, Russell. *The Intemperate Professor and Other Cultural Splenetics.* Baton Rouge: LSU Press, 1965. 163 pp.

Essays by a leading conservative. Especially see "American Colleges: A Proposal for Reform" (pp. 47–58); reprinted in Mayhew. *Higher Education in the Revolutionary Decades*), in which an argument is made for maintaining the distinctiveness of the small private liberal arts college in contrast to "Behemoth University." The college should teach enduring truths within a concise curriculum, and should abandon vocationalism, specialized and professional studies, athletics, and other extracurricular activities. The elective feature should be reduced to a minimum, for "the undergraduate ordinarily is not yet capable of judging with discretion what his course of studies ought to be." In addition to improving human reason, "The college should inculcate in its students a sense of diffuse gratitude toward the generations that have preceded us in time . . . ." A refreshingly antique essay.

Also see "The Uninteresting Future" (pp. 143–151) in which Kirk argues against boredom and the conversion of town and country into "one great hygienic slum."

489. Burnett, Collins W., and Frank W. Badger (eds.). *The Learning Climate in the Liberal Arts College: An Annotated Bibliography,* Charleston, W. Va.: Morris Harvey College, January 1970. 87 pp. (Available from The College Store, 2300 MacCorkle Ave.)

About 600 items, largely journal literature from 1950–1969, with brief non-critical annotations. Categories include the liberal arts approach, curriculum, teaching methods and the new media, and the teaching-learning process.

D. DISCIPLINES AND PROFESSIONS

490. Stent, Gunther S. *The Coming of the Golden Age: A View of the End of Progress.* N.Y.: Natural History Press (for the American Museum of Natural History), 1969. 146 pp. $4.95.

A molecular biologist argues that the arts and sciences are reaching the logical end of their evolution, with the Golden Age viewed as the last stage of history: "a re-creation of Polynesia on a global scale" (p. 137); the fruit of the frantic efforts of "Faustian Man" whereby leisure time is devoted to sensual pleasures.

491. Glass, Bentley, "Science: Endless Horizons or Golden Age?", *Science,* 171: January 8, 1971, pp. 23–29.

The AAAS presidential address delivered December 1970 in Chicago, examining the extremes in the spectrum of belief in the future of science. Contrasting Vannevar Bush's *Endless Horizons* (1946) with Roderick Seidenberg's *Posthistoric Man* (1950) and Gunther Stent's *The Coming of the Golden Age* (1969), Glass sides with the Golden Age authors by observing that "so awesome is already the accelerating rate of our scientific and technological advance that simple extrapolation of the exponential curves shows unmistakably that we have at most a generation or two before progress must cease." (p. 26)

"The next age of scholarship will no doubt promote processors and analysts who need only to delve in the mountains of extant scientific and technological literature for forgotten and uncomprehended items of knowledge." (p. 27) But Glass appears to be ignoring the social sciences, as well as the need for disseminating scientific information, both hard and soft.

492. Glass, Bentley. *The Timely and the Timeless: The Interrelationships of Science, Education, and Society.* New York: Basic Books, 1971. $4.95.

Looks at the implications of the gap between public understanding and scientific knowledge. "His plan of action: to blend once and for all all subject matter with method of inquiry in science education, and to make mandatory the regular return of professional people to the university for continuing education." (advt.)

493. March, Michael S. *Federal Budget Priorities for Research and Development.* Chicago: University of Chicago, Center for Policy Study, 1970. $1.50.

"A study of the federal government's role in science, including a detailed analysis of President Nixon's 1971 federal budget for science programs." (brochure)

494. U.S. Congress. House Subcommittee on Science, Research, and Development. *Toward a Science Policy for the United States.* Washington: USGPO, November 1970.

Advocates a task force to draft a statement of national science policy and a new umbrella agency to coordinate research (The National Institutes of Research and Advanced Studies).

495. Hammond, G. S., "The Future of Chemical Science," *Chemical Technology*, January 1971, pp. 24–26.

Charges that chemistry has become conservative, acquisitive, and self-propagating in the past few decades and that it could disappear as an explicit discipline and become absorbed elsewhere. Although not bemoaning this possibility, Hammond advocates the enunciation of long-range prospects for the various branches of chemistry.

496. National Academy of Engineering. *Engineering for the Benefit of Mankind.* Washington: NAE Printing Office (2101 Constitution Ave.), 1970?. 160 pp. $5.50 paper.

Based on a University of Michigan symposium held in fall 1967. Especially see Jay W. Forrester, "Engineering Education and Engineering Practice in the Year 2000."

497. DeSimone, Daniel V. (ed.). *Education for Innovation.* Oxford: Pergamon Press, 1968. 180 pp.

14 articles derived from a Woods Hole conference on creative engineering education, sponsored by the National Academy of Engineering, NSF, and the U.S. Department of Commerce. "What is suggested is a recognition of the essential nature and role of engineering, the learning of engineering by behaving like an engineer, and an increased emphasis on the excitement of discovering for oneself. In short, what is proposed is that engineering education be kept alive and relevant—that it truly be education for innovation." (p. 20)

498. Steinhart, John S. and Stacie Cherniack. *The Universities and Environmental Quality—Commitment to Problem Focused Education.* A Report to The President's Environmental Quality Council. Washington: Executive Office of the President, Office of Science and Technology, September 1969. USGPO. 71 pp. $.70.

A report on several multidisciplinary environmental programs. Despite some promising starts, there is still a severe shortage of ecology professionals, and the report suggests actions that the federal government can take, such as assisting in the formation of colleges and universities of Schools of the Human Environment.

499. National Academy of Sciences, Committee on Science and Public Policy (COSPUP). *The Life Sciences.* Washington: NAS Printing and Publishing Office (2101 Constitution Ave.), December 1970. 526 pp. $10.50.

The last of a series of COSPUP reports to establish needs and priorities in various areas of science. Produced by a 29-member committee, there are 31 pages of recommendations, including a request for an additional $250 million a year in federal support for biological research, and various educational reforms such as a core curriculum for biology undergraduates, instruction in "humanistic" biology for students in other fields of science, standardized Ph. D. programs, upgraded laboratories, and a special curriculum for high school and junior college teachers. According to one reviewer, this report "would appear to be an unfortunate waste of effort" (Robert J. Bazell, *Science*, December 18, 1970, p. 1286).

500. Bender, A. Douglas et. al., "Delphic Study Examines Developments in Medicine," *Futures*, 1 : 4, June 1969, pp. 289–303.

The results of a Delphi study conducted for Smith, Kline & French Laboratories as an aid to planning for the pharmaceutical market. Covers areas of biomedical research, diagnosis, medical therapy, health care, and medical education. From these results, a scenario of "Medicine.1980" is constructed. (pp. 294–300)

501. Carnegie Commission on Higher Education. *Higher Education and the Nation's Health: Policies for Medical and Dental Education.* A Special Report of the Commission. N.Y.: McGraw-Hill, October 1970. 128 pp. $2.95.

The profound changes stemming from the Flexner report of 1910 have resulted in a high quality of training and service. This present report, placing itself in the context of a "great transformation already under way, "recommends the creation by 1980 of 126 health education centers and 9 health-science centers (in addition to the 27 planned for construction during the decade); increasing the number of medical doctors by 50% and the number of dentists by 20%, shortening the training period of physicians from 8 to 6 years and of dentists from 4 to 3 years, increasing opportunities for women and members of minority groups, increasing federal support for medical education, establishing a National Health Manpower Commission, creating a voluntary health services corps, reducing the student-faculty ratio while creating other economies, improving the curriculum, and creating several paths to the professional degree; in short, a plan is offered for the entire system of health care delivery in the United States. Recommended

502. Krevans, Julius R. and Peter G. Condliffe (eds.). *Reform in Medical Education: The Effect of Student Unrest.* Washington: National Academy of Sciences, 1970. 244 pp. $7.95.

Proceedings of an international colloquium on reform in medical education, Bethesda, Md., April 1969. Advocates a redefinition of the role of the medical schools in the community and the participation of students in planning curriculums.

503. "National Commission for the Study of Nursing and Nursing Education: Summary Report and Recommendations," *American Journal of Nursing*, 70: February 1970, pp. 279–294.

Also see a forthcoming special report by the Carnegie Commission on Higher Education, *New Students and New Places*, which will devote considerable attention to changes in education of nurses and allied health workers.

504. Lidz, Theodore and Marshall Edelson (eds.). *Training Tomorrow's Psychiatrist: The Crisis in Curriculum.* New Haven: Yale, 1970. $7.50; paper $1.95.

505. Watts, Donald G. (ed.). *The Future of Statistics: Proceedings of the University of Wisconsin Conference, 1967.* N.Y.: Academic Press, 1968. 315 pp.

506. National Academy of Sciences, Committee on Science and Public Policy, and Social Science Research Council, Committee on Problems and Policy. *The Behavioral and Social Sciences: Outlook and Needs.* A Report by the Behavioral and Social Sciences Survey Committee. Englewood Cliffs: Prentice-Hall, 1969. 320 pp. $7.95.

A systematic self-portrait by 6–10 member panels for each of ten social science disciplines, largely based on a questionnaire survey of research units at 135 universities. Separate reports are being published for each of the disciplines: anthropology, economics, history as social science, political science, sociology, psychology, geography, linguistics, psychiatry, and statistics.

This summary volume provides a good layman's overview of the social sciences: what they do, how they do it, and what they can be expected to contribute toward the formulation of public policy. Major recommendations are as follows: a system of social indicators culminating in an *Annual Social Report to the Nation* that identifies and measures fundamental changes in the quality of life for all people; in support of the above, a special technical commission to investigate and recommend procedures for a national system of statistical data reporting designed for social scientific purposes; the creation of new interdisciplinary programs of teaching and research symbolized by the organizational concept of a Graduate School of Applied Social Research; and an annual increase of 12–18% in federal support of basic and applied research. Recommended.

507. Special Commission on the Social Sciences of the National Science Board. *Knowledge Into Action: Improving the Nation's Use of the Social Sciences.* Washington: National Science Foundation, NBS 69–3, May 1969. 95 pp. $0.75.

Various recommendations focusing on revitalizing existing institutions, establishing new social institutions, and developing better channels for the flow of social science resources into American life.

508. Gouldner, Alvin. *The Coming Crisis in Western Sociology.* N.Y.: Basic Books, 1970. 528 pp. $12.50.

A lengthy essay on social theory and social theorists, addressed to Gouldner's fellow sociologists, although perhaps with import for those who study education, either as sociologist or educator. A continuing movement of Functionalism toward Marxism is seen, with the equilibrium point as a kind of "Keynesian Functionalism." At the same time, "there will be increased development of a more distinctly Marxist and radical sociology that will have an autonomous base in the emerging generation of younger sociologists." (P. 443.) These two trends signal "a transformation of the total structure of academic sociological perspectives . . . something that has hardly ever before existed." (P. 443.) To further this evolution, the final chapter argues for a "Reflexive Sociology" which means that "we sociologists must—at the very least—acquire the ingrained *habit* of viewing our own beliefs as we now view those held by others." (P. 490.)

509. Easton, David, "The New Revolution in Political Science." *The American Political Science Review*, 63:4, December 1969, pp. 1051–1061. (Presidential Address delivered to the 65th Annual Meeting of the American Political Science Association, September 1969, New York City)

Describes a new future-riented "post-behavioral revolution" with its battle cries of relevance and action, taking place not only in political science but simultaneously in the other social sciences. It is seen as "the most recent contribution to our collective heritage" and "an opportunity for necessary change."

Several of the tenets that are suggested for the post-behavioral credo are: substance must precede technique, behavioral science conceals an ideology of empirical conservatism, to know is to bear the responsibility for acting and to act is to engage in reshaping society, etc. "The search for an answer as to how we as political scientists have proved so disappointingly ineffectual in anticipating the world of the 1960's has contributed significantly to the birth of the post-behavioral revolution." (p. 1053) "Both our philosophers and our scientists have failed to reconstruct our value frameworks in any relevant sense and to test them by creatively contemplating new kinds of political systems that might better meet the needs of a post-industrial, cybernetic society." (p. 1058) Recommended

510. Eulau, Heinz and James G. March (eds.). *Political Science: The Behavioral and Social Sciences Survey.* Englewood Cliffs: Prentice-Hall, 1969. 148 pp. $5.95.

A part of the NAS–SSRC project (item 506), this report discusses changing frontiers of theory and research, personnel trends, prospects for research, and education for research. 15 recommendations are made, including national study centers, increasing the number of "strong" departments, new training programs, and expanded NSF funding for political science research.

511. Surkin, Marvin and Alan Wolfe (eds.). *An End to Political Science: The Caucus Papers.* N.Y.: Basic Books, 1970. $7.95.

As an adjunct to damning the discipline for conservatism and irrelevance, some of the papers contend that the teaching of political science fails to prepare the young to cope with the realities of power in America.

512. Lasswell, Harold D. *The Future of Political Science.* N.Y.: Atherton, 1964. 256 pp.

513. Marini, Frank. *Toward a New Public Administration: The Minnowbrook Perspective.* San Francisco: Chandler Publishing Co., March 1971. $7.00 text ed.; $3.95 paper.

514. Dror, Yehezkel. *Teaching of Policy Sciences: Design for a Post-Graduate University Program.* Santa Monica: The RAND Corporation, P–4128, June 1969. 27 pp. (Also see Sunderland, item 909)

"Presents a basic design for a post-graduate university program in policy sciences. Its main purposes are to raise issues and bring out the main dimensions of policy sciences teaching, rather than supply definite solutions or a detailed 'model program'." (Introduction)

515. Haber, David and Julius Cohen (eds.). *The Law School of Tomorrow.* New Brunswick, N.J.: Rutgers University Press, 1968. $10.00.

"Opinions of objectives and curricula for university law schools of the future expressed in a symposium by a group of distinguished judges, lawyers, and scholars." (*The Chronicle of Higher Education*)

516. Eldredge, H. Wentworth. "Education for Futurism in the United States: An On-Going Survey and Critical Analysis," *Technological Forecasting and Social Change* 2 (1970), pp. 133–148. Also see a briefer version. "Education in Futurism in North America," *The Futurist*, IV:5, December 1970, pp. 193–196.

An excellent survey of futures research and teaching. As of July 1970, approximately 90 institutions of higher learning (of which 7 were in Canada) were offering futurism or technological forecasting courses, with perhaps 100 academics involved in all of North America.

However, the focus and quality of the courses varies immensely. Generally, the intellectual roots were shallow, with very little awareness "of mankind's age-old Promethean strivings." Furthermore, "there was almost a complete lack of any implicit, much less explicit, social change theory." Various predictive techniques and teaching methods used are also covered, and the article is concluded with 17 summary propositions on the teaching of futurism.

517. "Universities Offer Courses in the Future," *The Futurist*, April 1969, pp. 38–40.

Brief notes on future-oriented courses being taught at Columbia, Princeton, Dartmouth, Case Western Reserve, San Jose State University, University of Texas, SUNY-Albany, and University of California at Berkeley, Los Angeles, and Davis. For further information on college-level courses on the future, see item 807.

518. Drucker, Peter F. (ed.). *Preparing Tomorrow's Business Leaders Today.* Englewood Cliffs, N.Y.: Prentice Hall, 1969. 290 pp.

23 essays by business leaders and business educators, based on a NYU symposium. Essays are divided into four sections: the changing environment, new dimensions of business, international business, and the mission of the business school. Although suffering from the usual limitations of an anthology, the focus is exemplary. Of special interest are articles on the information revolution, managing the knowledge organization, the multi-national corporation, and the corporation as an educational institution.

519. Ling, Cyril, C. (ed.). *The Next Half Century in Higher Education for Business.* St. Louis: American Association of Collegiate Schools of Business, 1969 (?).

Addresses presented during the Association's 50th annual meeting.

520. Bass, Herbert J. *The State of American History.* N.Y.: Quadrangle, 1970. 480 pp. $15.00.

"This collection of twenty original essays by distinguished historians represents the most serious attempt in recent years to see where we have been, what we are doing now, and what are the prospects for the future in the interpretation of American history." (advt.)

521. *The Future of the Humanities. Daedalus*, 98:3, Summer 1969.

17 articles on trends and issues.

522. Greenbaum, Leonard A and Rudolf B. Schmerl. *Course X: A Left Field Guide to Freshman English.* Philadelphia: Lippincott, 1970. 224 pp. $2.45.

A witty overview of Freshman English addressed to the two million students who must annually survive this ordeal. After analyzing the academy, personnel procedures, course content, assignments, and the history of Course X, the authors review various strategies for student survival. After rejecting the traditional strategies of suffering through, opting out, conning the course, and throwing oneself at the mercy of the teacher, it is recommended that students act to change the course into a learning situation that serves students' needs instead of the teacher's. This strategy is most readily carried out by forming a team for dealing with classroom situations and assignments. *Course X* is cynical, but not strident; it accepts the academic status quo, while pointing out that students can shape events to their interests—a form of educational policy-making at the "lowest" but perhaps most important level.

523. Robinson, Armstead L. et. al. (eds.). *Black Studies in the University: A Symposium.* New Haven: Yale University Press, 1969.

Eleven papers from a May 1968 symposium sponsored by the Black Student Alliance at Yale.

524. *On the Future of Art.* Sponsored by the Solomon R. Guggenheim Museum. N.Y.: Viking, 1970. 134 pp. $7.50; $3.45 paper.

Includes "Art: Communication or Esoteric?" by Arnold J. Toynbee, "Architecture: Silence and Light" by Louis I. Kahn, "Art and the Structuralist Perspective" by Annette Michelson, "Creating the Creative Artist" by B. F. Skinner, "Phenomenal Art: Form, Idea, and Technique" by James Seawright, "The Aesthetics of Intelligent Systems" by J. W. Burnham, and "Art as a Form of Reality" by Herbert Marcuse.

525. Sanders, Irwin T. and Jennifer C. Ward. *Bridges to Understanding: International Programs of American Colleges and Universities.* Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, December 1970. 304 pp. $7.95.

Finds international studies still largely underdeveloped and present levels of activity in serious jeopardy. Suggestions are made for trustees, the president and other administrators, the faculty, and students. Especially note the appeal to students to initiate action in order to maximize their intellectual development in international and intercultural learning and experience.

526. U.S. House of Representatives, Committee on Education and Labor, Task Force on International Education. *International Education: Past, Present, Problems and Prospects.* Washington: 89th Congress, 2nd Session, House Document No. 527. October 1966. 565 pp.

About 70 articles concerning higher education and world affairs, internationalizing the curriculum, educational exchanges, education for development, and organizing for international education.

527. Education and World Affairs. *The University Looks Abroad: Approaches to World Affairs at Six American Universities.* New York: Walker and Co., 1965.

These thorough case studies suggest a pervasive trend toward internationalization of institutions, staff, and curricula among major universities. This spirit of globalization appears to be tempered, however, by recent empirical studies combined with cutbacks in Federal funding.

528. Spencer, Richard E. and Ruth Awe (comps). *International Educational Exchange.* New York: Institute of International Education (809 UN Plaza, New York, N.Y. 10017), 1970. $6.00.

A comprehensive bibliography of writings in the area of international education, containing almost 4000 titles of books, articles, research reports (including dissertations and theses), pamphlets, and government documents.

E. GRADUATE EDUCATION

529. National Science Foundation. *Toward a Public Policy for Graduate Education in the Sciences.* Report of the National Science Board. Washintgon: USGPO, NSB 69-1, 1969. 63 pp. $.40.

Primarily addressed to graduate education and research in the natural sciences, the social sciences, and engineering, many of the conclusions of the report are nevertheless applicable to the arts and humanities. Graduate education is seen at having developed without an explicit national policy, and in that enrollments are expected to double and costs quadruple by 1980, substantial federal funding is seen as necessary. Recommendations are made to educational institutions, state and regional planners, and the federal government. "These recommendations are made in the firm conviction that no instrumentality of society can contribute more importantly to the future strength and well-being of the Nation and its citizens than does graduate education." (p. xii) Perhaps.

530. National Science Foundation. *Graduate Education: Parameters for Public Policy.* Report prepared for the National Science Board. Washington: USGPO, NSB 69-2, 1969. 168 pp. $1.25.

"Presents the statistical evidence, forward projections, analyses, and interpretations which underlie the conclusions and recommendations offered in the First Report . . . However, this is much more than an Appendix . . . It is both a unique analysis of the present status of graduate education and the source of a large body of information and useful correlations which should be invaluable to rational planning for graduate education and indeed for all of higher education." (p iii) The three chapters cover dimensions of graduate education (no. institutions, distribution of enrollment), correlates of quality (high quality found largely in large institutions and large departments), and financial perspectives. Many public policy issues are raised, such as creating new institutions vs. expanding existing ones, geographic priorities, offsetting a possible decline in quality during the next decade, etc.

531. Eurich, Alvin C., Lucien K. Kinney, and Sidney G. Tickton. *The Expansion of Graduate and Professional Education During the Period 1966 to 1980.* Studies in the Future of Higher Education, Report No. 2. New York: The Academy for Educational Development, April 1969. 96 pp.

Based on a sample of 149 universities, all of which were visited in 1967 by a team under the direction of Lewis B. Mayhew. The universities studied expected a growth of 130% in graduate and professional school enrollments from 1967 to 1977. But their plans were frequently not written down in any detail, "nobody knows how much the new and expanded graduate programs will cost in the future," (p. 6) and it was implicitly expected that there would be extensive aid from the federal government. No cutbacks in programs are being planned anywhere: "the theory seems to be that society is going to need more of everything for decades ahead." (p. 6) This document may be somewhat outdated due to recent cutbacks in federal funding of science, and the more recent report by Mayhew (see below).

532. Mayhew, Lewis B., *Graduate and Professional Education, 1980: A Survey of Institutional Plans.* An Essay Written for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, 1970, 38 pp. $3.95.

A brief but very important document, based on the site visits of 1967 (see above) as well as a second inquiry during 1968–69, involving 800 questionnaires of which 368 were returned. The findings are similar but more refined, and, as Clark Kerr notes in the foreword, "His data raise grave questions about federal policy, state policy, and the policies of individual institutions." Mayhew concludes that:

"This view of the future, based as it is on actual institutional expectations, leaves several inescapable impressions. Much of the planning presumes a continuation of practices and trends established during the 1960's. But there is serious doubt that this will happen. There could be in sight a serious oversupply of advanced-degree recipients, many of whom will have been educated in developing institutions without wide experience or reputation in graduate work. Whether this will be supported is moot. And equally unknown is what disposition will be made of the thousands of new Ph. D.'s and master's degrees. If the history of other oversupplies is repeated—that in engineering, for example—it seems likely that there will be a substantial upgrading of the training of teachers in lower levels of schooling and an upgrading of educational requirements in business and government." (p. 32)

Also of interest is an appendix listing the "Rank Order of Master's and Doctoral Programs Offered and To Be Offered by 1980." Recommended.

533. Sieber, Sam D. and Paul F. Lazarsfeld. *Reforming the University: The Role of the Research Center.* N.Y.: Columbia University, Bureau of Applied Social Research, February 1971. 180 pp.

Advocates research institutes as interdisciplinary superdepartments dealing with such broad academic areas as education, urban affairs, health, politics and government, and law and society. Graduate students would attend class only one year before entering an institute for perhaps two years of research leading to a dissertation. Students would work with a number of senior members on several different projects.

534. Heiss, Ann M. *Challenges to Graduate Schools.* San Francisco: Jossey-Bass, 1970. $9.75.

"Examines the role of the graduate institution and its value; the quality of graduate study; the effective training of teachers as opposed to researchers; the publish or perish predicament; the structure and organization of graduate study; the role of faculty in guiding students who lack potential as well as those who show promise; methods for establishing inter-divisional plans; extra-organizational schools, institutes, centers; cluster graduate centers; new social developments involving students and faculty as copartners; and the articulation of undergradaute and graduate programs." (advt.)

535. U.S. Office of Education. *Graduate Teaching Assistants in American Universities.* Washington: USGPO, 1970. $.40.

"Reviews recent trends in graduate teaching assistants' programs and makes recommendations for the future." (*The Chronicle of Higher Edution*)

F. DISTINCTIVE INSTITUTIONAL TYPES

536. Klotsche, J. Martin. *The Urban University and the Future of our Cities.* N.Y.: Harper & Row, 1966. 149 pp.

The Chancellor of the University of Wisconsin at Milwaukee proposes basic functions for the urban university to fulfill in meeting the crisis of urban areas.

537. Birenbaum, William M. *Overlive: Power, Poverty, and the University.* New York: Delacorte, 1969. 206 pp. $4.95; $1.95 paper.

The overlive society is the nonmilitary counterpart of overkill, resulting in a substantial number of citizens not sharing in technological and industrial success, or failing to discover any meaning in the success. Birenbaum sees the colleges and universities at the very center of the predicament, with their schism between thought and action, their isolation from the dynamics of the city, and their twin organizing principles of time scarcity and knowledge monopoly—all resulting in a meaningless academic packaging system. Six proposals for renewal cover multilevel planning of education for youth in black urban communities, locating new institutions in ghettoes, viewing the ideal campus as the city, internship programs for all students, reorganizing knowledge around problems, and student freedom. Although not particularly deep and well-organized, this passionate and original analysis raises a number of critical questions. Recommended.

538. Educational Facilities Laboratories. *A College in the City: An Alternative.* New York: Educational Facilities Laboratories, 1969. 42 pp.

Based on the ideas in William Birenbaum's *Overlive*, and dealing with an alternative for the Bedford-Stuyvesant area of New York City. The aim is to create a university in which there are no walls and no outsiders, and where the community itself is viewed as the campus. Key elements involve "flexibility in the distribution of college facilities, the maintenance of the urban mix and joint occupancies, and the establishment of close links with every segment of the community." (p. 42)

539. Goodman, Paul. *The Community of Scholars.* New York: Random House, 1962. Advocates apartment-sized universities.

540. Carnegie Commission on Higher Education. *From Isolation to Mainstream: Problems of the Colleges Founded for Negroes.* A Report of the Commission. New York: McGraw-Hill, February 1971. 86 pp. $1.95.

To help the country's 105 black colleges and universities emerge from their "historic isolation" (especially in the face of improved recruiting of black students and faculty by predominantly white institutions) the Commission recommends a tripling of federal support, preparation for a doubling of enrollment, the possible merger of several smaller schools, enrichment of existing curricula, and improved college preparatory programs for blacks to help reduce the costly remedial instruction now necessary at many black colleges.

541. LeMelle, Tilden J. and Wilbert J. *The Black College: A Strategy for Relevancy.* New York: Praeger. 1969. 144 pp. $10.

Argues that black Americans, in the new spirit of self-determination, need their own institutions. The LeMelles offer a "project-oriented design for change," fired by the ideology of "black pragmatic realism," and including proposals such as a national education consortia project, a college merger project, and a national manpower development and utilization center project.

542. Wilcox, Preston (comp.). *The Black University: A Bibliography.* N.Y.: 10 pp. Mines. National Association for African Education, July 1969.
   100 items, not annotated.

543. Dunham, E. Alden. *Colleges of the Forgotten Americans: A Profile of State Colleges and Regional Universities.* Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, 1969. 206 pp. $5.95.

544. Gaff, Jerry G. and Associates. *The Cluster College: Innovations and Consequences.* San Francisco: Jossey-Bass, 1970. $8.50.
   "Provides the first systematic study of the cluster college, a collegiate model which permits schools to preserve the best features of both the small college and the large university. The authors describe and analyze the purposes and practices of these schools, illuminating such details as the utility of the cluster concept, the various methods of accommodating cluster colleges in different universities, the innovations in curriculum, grading, instruction, governance, and residence requirements" (advt.).

545. Riesman, David, Joseph Gusfield, and Zelda Gamson. *Academic Values and Mass Education.* N.Y.: Doubleday, 1970. $7.95.
   Case studies of the college-within-a-college: Oakland and Montieth, set up in 1959 by Michigan State and Wayne State Universities respectively. "How they have survived—and why—is the subject of a fascinating, important report that draws some conclusions quite as controversial as those in Riesman's and Jenck's *The Academic Revolution.*" (advt.)

546. Johnson, Byron Lamar. *Islands of Innovation Expanding: Changes in the Community College.* Beverly Hills, Calif.: Glencoe Press, 1969. 352 pp.
   An authoritative report on a 1967–68 nonstatistical survey of innovation in instruction at more than 200 junior colleges. From the context of change in society, education, and junior colleges in general, Johnson discusses specific innovations such as coop work-study, programed instruction, the systems approach to instruction, gaming, students as teachers, independent study, etc. Aids and obstacles to innovation are then discussed, with concluding comments on the need for evaluation. Several trends are extrapolated into the short-range future. Recommended.

547. Altman, Robert A. *The Upper Division College.* San Francisco: Jossey-Bass, 1970. 202 pp. $7.75.
   A thorough history of the upper division college, concluding with a chapter of cautious "conjecture." Future institutions will probably place less emphasis than before on the liberal arts degree in favor of the newly developing bachelor of technology degree or its equivalent; they will be predominantly urban and will probably offer work through the master's degree. "Predicated upon assumptions of social need . . . upper division institutions are a logical response for a public system facing enrollment pressures at the junior year or a need for additional baccalaureate education. If junior colleges did not exist, if they were not predominantly public, or if the hesitancy to convert or expand them did not exist, upper division colleges would not develop in increasing numbers and locations" (p. 171). In turn, "the way in which future upper division institutions develop will greatly affect the development of existing junior colleges." (p. 175).

548. Shores, Louis, Robert Jordan, and John Harvey (eds.). *The Library College: Contributions for American Higher Education at the Jamestown College Workshop, 1965.* Philadelphia: Drexel Press, 1966. 287 pp.
   An anthology of 33 papers on the Library-College concept, in addition to background planning documents of the idea as elaborated at Jamestown College, North Dakota.

549. Hamilton, Blair (ed.). *Free Universities, Experimental Colleges, and Free* Schools. Washington: National Student Association, 1968. 66 pp.
   Lists a wide variety of innovations throughout the country.

550. Lauter, Paul and Florence Howe, "What Happened to the 'Free University'," *Saturday Review,* June 20, 1970 (condensed from the author's book, *The Conspiracy of the Young,* World 1970).
   A history of free universities from their intellectual origins in 1962.

551. Fischer, John, "Survival U: Prospectus for a Really Relevant University," *Harper's,* September 1969, pp. 12–22.

Viewing today's liberal arts education as incoherent and irrelevant, it is argued that at a minimum, any successful reform should be founded on a single guiding concept and capable of equipping young people to do something about the world. The idea of survival is the only idea that fits these specifications. Thus, at Survival U, the motto would be "What must we do to be saved?" Rather than being detached, all of the faculty would be committed to the cause. The biology department would concentrate on problems of population and pollution; engineering departments would stress waste disposal and where not to build dams and highways as well as how to build them; mathematics would teach social accounting; and government would look at why our institutions have done so badly and whether they can be renewed. Although brief and lightly written, the idea of Survival U warrants further exploration. Recommended.

552. *The International Ecology University. Why and How: A Program*, Berkeley, Calif.: International Ecology University Publications, 1970. 86 pp. Paper.

553. Madsen, David. *The National University: Enduring Dream of the U.S.A.* Detroit: Wayne State, 1966. 178 pp.

The history of a proposal for a University of the United States, an idea first debated at the Constitutional Convention of 1787, which may once again enjoy a revival of interest through the efforts of the Steiner Committee to establish a prestigious post-doctoral institution for study and research.

554. Zweig, Michael. *The Idea of a World University.* Edited with a foreword by Harold Taylor. Carbondale: Southern Illinois University Press, 1967. 204 pp.

A thorough exploration of a recurring idea for an institution "which would match on an intellectual scale what the United Nations was designed to accomplish in a political dimension . . . a rough estimate would be that since the end of World War I, more than one thousand such proposals have been made." (Taylor in Foreword, pp. v-vi) Zweig explores the needs, alternatives (international exchanges, area study programs, etc.), the history of the proposal, and what needs to be done. Recommended.

G. FACILITIES AND TECHNOLOGY

555. Ashby, Eric. *Technology and the Academics: An Essay on Universities and Scientific Revolution.* N.Y.: Macmillan, 1958. 117 pp.

556. Educational Facilities Laboratories. *Bricks and Mortarboards.* N.Y.: EFL (477 Madison Avenue), November 1966, 168 pp. Free.

Five excellent overview articles by professional writers on classrooms, laboratories, libraries, dormitories, and campus design (especially see Alvin Toffler on the intellectual problems of the libraries of the future). "This book sets forth the difficult physical problems that beset American colleges and universities today, the far tougher physical problems looming just ahead, and an array of imperative reforms." (p. 163) The intent is to "produce buildings that serve rather than stifle higher education in the crucial years ahead." (p. 5) Recommended.

557. "Membrane Structures For Living and Learning To Be Pioneered on Three Campuses," *EFL College Newsletter* 10, September 1970, pp. 2–7. (Available free from Educational Facilities Laboratories, 477 Madison Ave., New York, New York 10022)

Discusses the plans of Antioch College, La Verne College, and the Student Housing Cooperative at Princeton to employ the low-cost luminous membrane bubbles inspired by R. Buckminster Fuller.

558. U.S. Office of Education. *College and University Enrollment and Physical Facilities Survey, 1965–1970.* Washington: USGPO, OE–51004–19, September 1967. 6 pp.+17 tables.

Ascertain plans to accommodate increased enrollments through 1970.

559. Boehm, B. W. *The Professor and the Computer: 1985.* Santa Monica: The Rand Corporation, P–3527, 1967.

560. Caffrey, John G. *Computers in Systems of Higher Education.* Santa Monica: Systems Development Corporation, SP–2213, December 1965. 11 pp.

561. Tschirgi, Robert D., "Regional and National Networks" in Ralph W. Gerard (ed.), *Computers and Education.* N.Y.: McGraw-Hill, 1967, pp. 275–303.

Discussion of broad trends and the need to develop communication networks for archival, inter-university, university-community, and international needs. Rest of Gerard volume tends toward a how-to-do-it discussion concerning computer applications.

562. U.S. President's Science Advisory Committee. *Computers in Higher Education: Report of the President's Science Advisory Committee.* Washington, USGPO, 1967.

II. FINANCE

563. Kaysen, Carl. *The Higher Learning, The Universities, and The Public.* The Stafford Little Lectures, 1968. Princeton: Princeton University Press, 1969. 85 pp. $4.95.

The Director of the Institute for Advanced Study discusses the present allocation of federal funds to scientific research and higher learning, and proposes an alternative that "attempts to reconcile government support with the true interests of the universities." (advt.)

564. Wolk, Ronald A. *Alternative Methods of Federal Funding for Higher Education.* Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, 1968 (?). 272 pp. $2.00.

565. Bowen, William G. *The Economics of the Major Private Universities.* Berkeley: Carnegie Commission on Higher Education, 1968. 66 pp. $1.25.

As of spring 1967, Bowen analyes economic trends and projects expenditures and income for major private universities to 1975–76, concluding that "in the absence of significant new developments, the economic squeeze already being felt by the major private universities is going to intensify greatly." (p. 54) Subsequent developments (economic recession and student unrest leading to an attrition of alumni contributions) have made the financial situation even bleaker.

566. Cheit, Earl F. *The New Depression in Higher Education.* Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, March 1971. 192 pp. $5.95.

Examines 41 private and public colleges and universities, finding 70% of them either "in financial difficulty" or "headed for trouble." The problem is seen as costs and income both rising on the whole, but costs rising at a slowly growing rate while income is growing at a declining rate. All types of institutions have been affected by this financial crisis, and even those not presently in trouble can expect severe problems if present trends continue. Decisions about reform in the next decade will therefore be influenced more by the financial situation than by any other factor. Recommended.

567. Freeman, Roger A. *Crisis in College Finance? Time for New Solutions.* Washington: Institute for Social Science Research, 1965. 243 pp.

Similar to his two volumes on *Financing the Public Schools* (items 361, 362) this is also a thorough study, with a conclusion advocating tax credits as an aid to maintaining diversity and freedom of choice.

568. Hansen, W. Lee and Burton A. Weisbrod. *Benefits, Costs, and Finance of Public Higher Education.* Chicago: Markham Publishing Co., Fall 1969. 115 pp. $3.95.

"Illuminates the range of problems associated with the determination of costs and benefits of higher education and explores alternative proposals for paying the costs. The book focuses on financial planning for higher education in California, but the findings are equally relevant for every state firmly committed to providing access to college for substantial numbers of its citizens. The authors also discuss the relationship between financial planning and legislative policy, the distinction between equity and economic efficiency, and questions which suggest needs for future research." (advt.)

569. Chambers, M.M. *Higher Education: Who Pays? Who Gains?: Financing Education Beyond the High School.* Danville, Ill.: Interstate Printers, 1968. 302 pp.

570. Buchanan, James M. and Nicos E. Devletoglou. *Academia in Anarchy: An Economic Diagnosis.* N.Y.: Basic Books, 1970. 187 pp.

571. College Entrance Examination Board. *Financing Equal Opportunity in Higher Education.* A College Scholarship Service Colloquium Held at Scotsdale, Arizona, November 1969. N.Y.: CEEB, 1970. 44 pp. $1.00.

Eight articles concerning topics such as the federal government and student financial aid, student reactions to aid policies, the average-income student, Chicanos, black students, and disadvantaged students in private universities.

572. "Learn Now, Pay Later," *The New Republic*, February 20, 1971, pp. 12–13.

A brief report on the Pay as you Earn (PAYE) plan proposed by Yale University, which might alleviate the financial problems of higher education by removing much of the cost burden from taxpayers and placing it on the beneficiaries. Any student would be able to borrow money, and repayment would be over a period of about 35 years at an amount dependent on the level of income; thus, students in high-paying fields of work would repay more than they borrowed, while those making less would repay less. If the Yale pilot idea is successful, the scheme may be tried nationally, with a resource bank similar to FHA, and loan repayments incorporated in the federal income tax and payroll withholding. The State of Ohio is also considering a similar scheme. The genesis of the Yale plan is not known; however, the idea has appeared in at least three recent instances (see the following items).

The PAYE plan is intended to promote equality of opportunity, similar to voucher proposals for elementary and secondary education. (see items 352–354)

573. Platt, William J. and Janet Abrams. *A Self-Financing Fund for Student Charges in Higher Education.* Menlo Park: Stanford Research Institute, Educational Policy Research Center, Research Note EPRC–6747–7, October 1968. 22 pp.

"A purpose of this paper is to outline a proposal for a student aid portion of financing higher education. This proposal is for a federally administered self-financing fund for reimbursing tuitions and fees. It would be supported by an earmarked surcharge on the federal income tax . . . to be levied on the beneficiaries of higher education . . . The surcharge on the income tax would be graduated upward with years of post-secondary attainment of the taxpayer . . . The progressive nature of the income tax would assure that the amount an individual paid into the fund would be adjusted to his ability to pay."

574. Tobin, James and Leonard Ross, "A National Youth Endowment: Paying for the High Costs of Education," *The New Republic*, May 3, 1969, pp. 18–21.

"At present, the vast majority of post-high school vocational students must pay their way without any form of government assistance . . . (compounding) the inherited inequalities with which our young people grow up." (p. 19) The authors propose a line of credit or "endowment" available for every young man and woman between the ages of 18 and 28, to be applied to any form of post-secondary education. Rather than have student choices affected by the availability of funding in certain programs, such a program "would leave the choice of schooling entirely up to the student." Repayment would be over the individual's lifetime, and, like Social Security, the Youth Endowment would eventually be self-financing.

575. Clurman, Michael, "How Shall We Finance Higher Education?" *The Public Interest*, No. 19, Spring 1970, pp. 98–110.

Concludes that "In order to create a more desirable set of student attitudes, then, we must encourage students to pay the bulk of the direct costs of their education out of their future incomes and make the prosperity and survival of colleges and universities directly dependent on their ability to attract students in open competition in a free market."

576. Kristol, Irving. "A Different Way to Restructure the University," *The New York Times Magazine*, December 8, 1969.

A prominent social critic proposes that universities be financed by public grants to students, rather than institutions.

577. Fein, Rashi and Gerald Weber. *Financing Medical Education: An Analysis of Alternative Policies and Mechanisms.* Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, January 1971. 295 pp. $6.95.

578. Peterson, P. G. *Foundations: Private Giving and Public Policy.* Chicago. University of Chicago Press, January 1971.

579. Connery, Robert H. (ed.). *The Corporation and the Campus: Corporate Support of Higher Education in the 1970's.* Proceedings of the Academy of Political Science, XXX:1. N.Y.: Columbia University APS (413 Fayerweather Hall), 1970. 187 pp.

The result of a November 1969 conference jointly sponsored by APS and the Council for Financial Aid to Education, bringing together educational leaders, corporation executives, and minority group spokesmen. 17 articles resulted, grouped under three headings: Challenges of the 1970's, Financing Higher Education, and the Corporate Viewpoint. In a summary chapter by Roger M. Blough, it is concluded that "Although voluntary support will likely increase in absolute dollars during the next decade, it will probably decline as a percent of the income for higher education." (p. 184)

580. Fromkin, Joseph. *Aspirations, Enrollments, and Resources: The Challenge to Higher Education in the Seventies.* Washington: U.S. Office of Education, OE–50058. 1970. 151 pp. $1.25.

"This study attempts to estimate the federal resources required to fulfill the aspirations of Americans for post-secondary education. It draws up two possible levels of support for 1976: one just to meet the minimum aspirations of the Nation, $1.8 billion for student support, with possibly another $2.0 bilion for institutional support; and another budget which is more likely to allow the poor to participate in post-secondary education . . . $3.5 billion for student support, plus $4.5 billion in institutional aid." (p. 1) The aspirations of post college-age adults are not considered here.

581. U.S. Office of Education. *Students and Buildings: An Analysis of Selected Federal Programs for Higher Education.* Washington: USOE, Office of Program Planning and Evaluation, Planning Paper 68–2, May 1968. 72 pp.

Discusses undergraduate and graduate student aid, aid for facilities construction, and growth of higher education. Projections of requirements for major higher education aid programs are made to 1972–73.

I. MISCELLANEOUS

582. Ward, Richard F. and Theodore E. Kurz. *The Commuting Student.* Detroit: Wayne State Univeristy, Commuter Centers Project, 1969.

A pioneering study, advocating campus outposts, academic "town houses," campus streets, more grassy areas, etc., to satisfy the needs of non-residential urban students.

583. Tanck, James. *College Volunteers. A Guide to Action: Helping Students to Help Others.* Washington: National Program for Voluntary Action, n.d. (1969?). 73 pp. (Available from USGPO, 40 cents)

Although a manual "written mainly for the school that has no volunteers, or that has only the bare beginnings of a program," there are important policy implications in supporting a comprehensive volunteer program, not only as a device to channel student enthusiasms into constructive pursuits, but as an important supplement to education at lower levels and a bridge to the community. The number of college volunteers is growing at a very rapid rate, and the Gallup organization is cited for their finding that 71% of students would consider working as part-time volunteers.

584. National Research Council. *The Invisible University: Postdoctoral Education in the United States.* Washington: National Academy of Sciences, 1969. 310 pp.

A thorough overview of the extent and nature of postdoctoral activity, with chapters devoted to an historical view; demography; implications for the postdoctoral, academic institutions, and nonacademic institutions; the foreign postdoctoral; finances; and conclusions and recommendations. Based on a census questionnaire, it is estimated that, as of 1967, there were 16,000 postdoctorals, largely in the natural and medical sciences, and largely concentrated in a few elite institutions. About half are foreigners.

585. Walton, Sidney F., Jr., "Seven Proposals for Black-Directed Change," *College Board Review*, No. 71, Spring 1969, pp. 18–21.

Part of special section on "The black agenda for higher education" advocates ending the use of the term "Negro," employing more minority persons, developing "community counselor" positions to serve as linkage between school staff and minority communities, a credential major and minor in Afro-American studies, issuing credentials to persons with A.A. degrees, recruiting minority teachers with A.A. degrees, and a four-period or less teaching day that allows meaningful in-service training.

586. Wright, Nathan, Jr., *What Black Educators are Saying.* N.Y.: Hawthorn, Spring 1970.

587. Spurr, Stephen H. *Academic Degree Structures: Innovative Approaches.* Principles of Reform in Degree Structures in the United States. Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, 1970. 213 pp. $5.95.

Advocates a reduction of the 1600 different degree titles presently used to about 60, along with a consistent nomenclature for six higher education levels: associate, bachelor, master, intermediate graduate, doctoral and post-doctoral. By giving an associate's degree or certificate after the sophomore year in four-year colleges, the A.A. would no longer be considered a second-rate degree and fewer students would be considered as college dropouts.

588. Heckman, Dale M. and Warren Bryan Martin. *Inventory of Current Research on Higher Education 1968.* N.Y.: McGraw-Hill, December 1968.

A joint project of the Carnegie Commission on the Future of Higher Education and the Center for Research and Development in Higher Education at UC, Berkeley, the inventory lists more than 900 items of projects completed in 1966–68 and research continuing into 1969. Many of these projects consider trends and futures. 220 of these projects are briefly described in *The Chronicle of Higher Education*, November 25 and December 9, 1968.

589. Walton, Stephen. *No Transfer.* N.Y.: Vanguard, 1967, 236 pp.

A novel describing a futuristic Modern University: a skyscraper ivory tower where those with unsatisfactory records are publicly guillotined.

IV. Other Educating Institutions

A. PRE-SCHOOL

590. Hunt, J. McVicker. *The Challenge of Incompetence and Poverty.* Urbana: University of Illinois Press, 1969. 290 pp. $9.50; $3.45 paper.

"The role of early education and new conceptions of intelligence in breaking the poverty-incompetence cycle, 'perhaps within a single generation'." (advt.)

591. Robison, Helen F. and Bernard Spodek. *New Directions in the Kindergarten.* Early Childhood Education Series. N.Y.: Teacher's College Press, 1965. 214 pp. $3.25 paper.

Proposes intellectual content appropriate for today's children, including a way of defining goals that will enable kindergarten teachers "to cultivate the roots of learning that will be significant to the entire life of an individual learner . . . too few children are being prepared to cope with an increasingly technical and complex society." (pp. vi, 1)

592. Pines, Maya. *Revolution in Learning: The Years from Birth to Six.* N.Y.: Harper and Row, 1967. 244 pp.

A journalistic overview assessing current developments in "pre-school" education. There is little focus on trends *per se*, and no mention of the future—but this is a good statement on an area of critical importance to the future of education, with implications of higher student input quality and perhaps a re-definition of "school" insofar as clientele served.

593. Pines, Maya, "Why Some 3-Year-Olds Get A's—And Some Get C's," *The New York Times Magazine*, July 6, 1969.

An overview of recent research in the emerging field of the "growth sciences." One social scientists predicts that "Within 30 to 50 years . . . the kind of child who is rated outstanding today will be considered merely normal, as a result of more skillful child-rearing." Another researcher suggests that teachers should take on a new role of training parents and involving the entire family in preschool education. It is concluded that the years from birth to 3 may soon become "a target of first priority."

594. Montessori, Maria. *The Child in the Family.* Trans. by Nancy Cirillo. Chicago: Regnery, 1970. 120 pp.

A summation of Dr. Montessori's thinking on early childhood. First published in Italian in 1956. There are many books by and about the Montessori Method and Montessori schools—this one is not necessarily the best.

B. ADULT AND CONTINUING EDUCATION

595. Blakely, R. J. *Toward a Homeodynamic Society.* Boston: Center for the Study of Liberal Education for Adults, 1965. 54 pp. $1.50. (Notes and Essays on Education for Adults, no. 49).

"This essay is an attempt to answer two big questions: 'What are the important social trends? What are their implications for education?' . . . The major trend of the present age is to increase knowledge and power. The major problem is the widening gap between knowledge and power and our ability to control them. The major implication is that our learning to control knowledge and power must overtake our learning to increase knowledge and power." (p. iii) In going on to advocate the homeodynamic inventive society, Blakely distinguishes between three types of learning (hereditary-cultural, adaptive cultural, and inventive-cultural), and the necessary learning for the adult as parent, citizen, and worker. Recommended.

596. Dumazedier, Joffre. *Toward a Society of Leisure.* Translated from the French by Stewart E. McClure. Foreword by David Riesman. New York: The Free Press, 1967. 307 pp. (Originally published in 1962).

"Dumazedier believes that leisure is intricately related to the largest questions of work, family life, society, and politics. Basing his conclusions on empirical studies, he provides a rigorous analysis of leisure as it is manifested in recreation, relaxation, and self-improvement. He surveys the implications of a mass market for tourism, sports, movies, television, and education, noting the evidence of a burgeoning popular culture which tradition-oriented social critics have been reluctant to recognize. In addition, the author argues for further intensive study of leisure and for constructive planning in this area. He believes that if the age of material abundance is not to lead to a decline of artistic and intellectual achievement, society must devote as much attention to its cultural development as it does to economic and social problems." (book jacket)

597. Zeigler, Warren L. (ed.). *Essays on the Future of Continuing Education Worldwide.* Syracuse: Syracuse University Publications in Continuing Education, SU Press, July 1970. 141 pp. $3.00.

Eight articles discussing trends in adult education and methods of thinking about and planning for the future.

598. Moses, Stanley. *The Learning Force: An Approach to the Politics of Education.* Prepared for the U.S. Office of Education by the Educational Policy Research Center. Syracuse: EPRC, March 1970. 40 pp.

The Learning Force includes all students in Core institutions (elementary, secondary, and higher education) as well as those in the Periphery (corporation and military training programs, proprietary schools, anti-poverty programs, correspondence schools, formal courses conducted over educational television, and other adult education programs conducted by Core institutions, museums, libraries, unions, etc.). Moses supplies trend data (1940–1975) indicating that enrollments in the Periphery (assessed on a head count rather than an FTE basis) are growing at a rapid rate and will be about 25% greater than Core enrollments by 1975. It is concluded that "Activities in the Periphery provide the basis for developing a new framework for the considerations of educational policy. A consideration of the total Learning Force provides the basis for making an accurate assessment of the true dimensions of education in American society, not only regarding enrollments . . . but also total educational expenditures and employment. A consideration of the total learning force also provides the basis for making more rational decisions regarding policy for the Core as well as providing the basis for new initiatives in the Periphery." (p. 37) Recommended.

599. Tough, Allen. *The Adult's Learning Projects: A Fresh Approach to Theory and Practice in Adult Learning.* Toronto: Ontario Institute for Studies in Education, July 1971. Approx. 210 pp. and $7.00 (U.S. and Canadian).

The latest and most sophisticated of a series of studies conducted by Tough and his associates on self-initiated learning behavior. A "learning project" is a series of "learning episodes" totalling more than 7 hours, an episode being defined as an effort "in which more than one half of a person's motivation is to gain and retain certain knowledge and skill that is fairly clear and definite."

Among 66 adults, the in-depth interviews discovered that 65 had conducted at least one learning project in the past year, with an average of 8 distinct projects totalling 700 hours a year of learning effort. Less than 1% of these projects were motivated by academic credit, and about 70% of the projects were planned by the learner himself. Then 16-year-olds and ten 10-year-olds were also interviewed, with a parallel discovery of significant non-school learning activity.

Despite the small data base, Tough raises a number of fundamental questions for further research and for educational policy directed toward learners of all ages. Four clusters of suggestions are offered for making schools and colleges more useful in the light of observed learning behavior: producing graduates who are willing and able to set appropriate learning goals, providing students with a greater choice of how to learn, freeing the student to choose a larger proportion of subject matter that he wants to learn and decreasing the emphasis on credit as a motivation for learning. For adults, recommendations are made for better help and resources with both planning and actual learning, and for new ways of helping people become more competent as learners. Recommended.

600 Clark, Burton R. *Adult Education in Transition: A Study of Institutional Insecurity.* Berkeley: University of California Press, Third Printing, 1968. 202 pp.

No information is provided on the first and second printing, but the field work for this sociological study of educational administration was conducted in the Los Angeles school system in the 1952–1953 period. The final chapter discusses "Implications for Theory and Policy" for public school adult education programs.

601. Whipple, J. B. and D. S. Chertow (eds.). *The University and Community Service: Perspectives for the Seventies.* Syracuse: Syracuse University Continuing Education Series, May 1970. $3.00 paper.

602. Whipple, James B. and Gary A. Woditsch (eds.). *Oakland Papers: Symposium on Social Change and Educational Continuity.* Brookline, Mass.: Center for the Study of Liberal Education for Adults at Boston University, 1966. 75 pp.

Presented at Continuing University Symposium Series, Oakland University, Rochester, Mich. Papers by Peter F. Drucker, Max Lerner, Rollo May, and Margaret Mead.

603. Jessup F. W. (ed.). *Lifelong Learning: A Symposium on Continuing Education.* Oxford, Eng.: Pergamon Press, 1969. 178 pp.

604. Goldman, Freda. *A Turning to Take Next: Alternative Goals in the Education of Women.* Boston: Boston University Center for the Study of Liberal Education for Adults, 1965.

605. Liveright, A. A., "Continuing Education and Basic Economic Security" in Robert Theobald (ed.), *Committed Spending: A Route to Economic Security.* N.Y.: Doubleday, 1968; Anchor Books, 1969, pp. 145–172.

After discussing signs of progress toward lifelong learning and obstacles to the acceptance of The Learning Society, the late A. A. Liveright proposes a plan for lifelong learning and community service including the following essential ingredients: a national program based on new kinds of goals and incentives, new programs built upon the needs and aspirations of the underprivileged, basic changes in formal education that will inculcate the desire and skills for lifelong learning in future adults, a broader responsibility for continuing education of a college's graduates, new kinds of volunteer tasks and positions, and a new institutional form: a comprehensive "Uncommon School" or College in every major community which is planned, developed, housed, operated, and staffed primarily for the purpose of adult and continuing education, serving "as the hub not only for independent liberal education and studies but also . . . the focus in the community for health, family development, recreation, and self-fulfillment programs." (p. 160) Recommended.

606. Liveright, A. A. *A Study of Adult Education in the United States.* Boston: Boston University Center for the Study of Liberal Education for Adults, 1968. 138 pp. $2.00.

Although not primarily aimed at trends or futures, both are considered somewhat in this authoritative overview, which forecasts that "Even if nothing further is done to stimulate participation, adults involved in continuing education will triple in number within the next twenty years."

(p. 13) Some of the trends noted include an upgrading image (from "remedial" to "lifelong learning"), more courses specifically for adults, more non-credit courses, credit for experience, and new degree programs.

607. Alford, Harold J. *Continuing Education in Action: Residential Centers for Lifelong Learning*. N.Y.: Wiley, 1968.

"Sketches the origins of adult education and focuses on the planning required for continuing education facilities and programming." (*The Chronicle of Higher Education*, October 28, 1968)

608. College Entrance Examination Board. *College-Level Examination Program: Description and Uses, 1968*. Princeton, N.J.: CEEB, Publications Order Office (Box. 592), 1968. 56 pp. Free.

"The College Board's College-Level Examination (CLEP) began in 1965 with the broad purpose of developing a national system of placement and credit by examination primarily directed to higher education. The Program has five major objectives: to provide a national program of examinations that can be used to evaluate nontraditional college-level education, specifically including independent study and correspondence work; to stimulate colleges ad universities to become more aware of the need for and the possibilities and problems of credit by examination; to enable colleges and universities to develop appropriate procedures for the placement, accreditation, and admission of transfer students; to provide colleges and universities with a means by which to evaluate their programs and their students' achievement; to assist adults who wish to continue their education in order to meet licensing requirements or qualify for higher education." (p. 3)

This important development, utilizing five General Examinations, and, ultimately, more than 100 Subject Examinations, is already employed by several hundred colleges and universities. It may well prove to be an "Alternative Future for Learning" of major proportions, affecting higher education to a degree perhaps even greater than CEEB's College Board Examinations affect the behavior of high school juniors and seniors.

609. *The Open University: Prospectus 1971*. Buckinghamshire, England: The Open University (Walton, BLETCHLEY, Bucks.) November 1969. 112 pp. (More recent documents by and about the University are undoubtedly available.)

Beginning operations in January 1971, the Open University is a totally new concept that promises to have a major impact on higher education not only in Britain but worldwide.

Generally admitting students 21 and over, no formal academic qualifications are required for entrance, and only failure to progress adequately is a bar to continuation of studies. The B.A. degree is initially available, but the University also plans to offer the B.Phil., M.Phil., and Ph.D.

A general liberal arts curriculum is offered, and students work at home at their own time and pace, utilizing correspondence "packages," TV and radio programs, the services of 3000 part-time tutors and counselors a 250 local study centers located throughout the nation, and intensive one-week summer school study periods. Costs promise to be substantially lower than conventional campus-based higher education, and the initial enrollment of 25,000 represents an immediate 40% increase in the number of students entering Britain's universities.

610. Maclure, Stuart. "England's Open University: Revolution at Milton Keynes," *Change: The Magazine of Higher Education*, 3:2 March/April 1971, pp. 62–68.

An excellent survey by the editor of *The Times* Educational Supplement in London, of the history, present operations, and prospects of the Open University. The enrollment could be more than 100,000 in 5–6 years, but the dropout rate is expected to be high. "A graduation rate of 20% will represent a remarkable degree of success"; the actual figure might be less than 5%. Another difficulty is that, despite the enthusiasm for making higher education available to the working class, the vast majority of the initial applications were from the middle class, 40% alone from teachers. Nevertheless, "the Open University offers the prospect of a breakthrough in educational technology—not just the hardware but the planning and coordination of different techniques. It is bound to have a revolutionary impact on existing methods in higher education." (p. 68) Americans take note. Recommended.

611. Bienvenu, Bernard J. *New Priorities in Training: A Guide for Industry.* N.Y.: American Management Association, 1969. 207 pp. $10.50.

Argues that the bewildering rate of change demands that training become a continuous process, whereas at the present time, nine out of ten employee training programs are sporadic affairs. Advocates a "total training" process.

612. Reissman, Frank, Sumner M. Rosen, Joseph Featherstons, and Alan Gartner. ***Essays on New Careers: Social Implications for Adult Educators.*** Syracuse: Syracuse University Publications in Continuing Education, Notes and Essays on Education for Adults No. 65, July 1970. 82 pp. $2.50.

613. U.S. Department of Labor, Manpower Administration. *Toward the Ideal Journeyman. Vol. I. An Optimum Training System in Apprenticeable Occupations.* Washington: USGPO, 1970. 24 pp. $.25.

A summary monograph based on a two-volume study of apprenticeship by Alfred S. Drew (*Educational and Training Adjustments in Selected Apprenticeable Trades*), and outlining an optimal system of training for all trades that "would produce the 'ideal journeyman,' skilled in today's technology and adaptable to the technology of tomorrow." To overcome the important problem of skill obsolescence, "The report recommends that the trades develop a coordinated approach for identifying new developments and forecasting changes requiring modifications of trade training programs." (p. 15)

614. Anderson, Darrell and John A. Niemi. ***Adult Education and the Disadvantaged Adult.*** Syracuse: Syracuse University Publications in Continuing Education and ERIC Clearinghouse on Adult Education, Occasional Papers No. 22, November 1970. 96 pp. Bib. pp. 71–96. $1.50.

A review of the adult education literature to determine the role of education in altering the personal and social characteristics of disadvantaged adults, concluding that "Any plan for a remedy for disadvantage must be concerned with cultural change which involves an alteration in the over-all way of life. Piecemeal approaches directed toward the alleviation of individual distress will not solve the problem because they will not alter the basic cultural environment . . . Thus, it may be more economical in the long run to establish new programs unrelated to present educational institutions than to attempt to reconstruct existing systems."

The bibliography of 317 items is alphabetical and unannotated.

615. U.S. Office of Education, Adult Education Branch. ***A Comprehensive Plan for Solution of the Functionally Illiterate Problem. A Report on the Present: A Plan for the Future.*** Prepared by Management Technology, Inc. Washington: March 1968. 46 pp.

Plans and Adult Basic Education program for the EDP (Educationally Disadvantaged Population) of at least 24 million people, 18 and over, who have not completed eight years of school. Unfortunately, this definition of the "functionally illiterate" may not only be inaccurate, but increasingly obsolete as the minimum level for societal functioning continues to rise. The EDP Target Population is projected to the year 2008, without any consideration of changing definitions and needs.

616. Masters, William H. and Virginia E. Johnson. ***Human Sexual Inadequacy.*** Boston: Little, Brown & Co., 1970. 467 pp. $12.50.

Based on thorough research, proposes a program of sex education for adults conducted by therapeutic teams, to dissipate misconception, misinformation, and taboo. (Although obviously an area of learning which is outside the traditionally defined realms of "education," sex education for adults is nevertheless an emerging learning need in a society that is increasingly aware of sexual dysfunctioning. Indeed, this program may be necessitated as a corrective to educational practices of home and school.)

C. RELIGIOUS EDUCATION

617. Westerhoff, John H. III. ***Values for Tomorrow's Children: An Alternative Future for Education in the Church.*** Pilgrim Press, 1970. 128 pp. $4.95.

Addresses Protestant Christianity with a call for more vital concepts of church education.

618. McCluskey, Neil G., S.J. *Catholic Education Faces its Future.* Foreword by Theodore M. Hesburgh, C.S.C. Garden City: Doubleday, 1969. 311 pp. $5.95.

A leading authority confronts a wide array of issues at every level of Catholic education. A vital role is still seen for the Catholic school, although "It is not impossible that by the 1990's both the present public-school system and the Catholic system will be replaced by one comprehensive school system, publicly supported, within which the educational objectives of the religious groups can also be realized." (p. 289)

619. "The Future of Catholic Education in America," Special Issue of *The Notre Dame Journal of Education*, 2 :1, Spring 1971.

620. Koob, C. Albert and Russell Shaw, *S.O.S. for Catholic Schools: A strategy for Future Service to Church and Nation.* N.Y.: Holt, Rinehart, and Winston, 1970. $4.95.

Discusses the present situation and possible future state of Catholic education.

621. Brown, W. E. and Andrew Greeley. *Can Catholic Schools Survive?* N.Y.: Sheed, September 1970.

622. Greeley, Andrew M. *The Changing Catholic College.* NORC Monographs in Social Research, No. 13. Chicago: Aldine, 1968. 256 pp. $7.50.

D. LIBRARIES, PRINT MEDIA, AND MUSEUMS

623. Meise, Norman R. *Conceptual Design of an Automated National Library System.* Metuchen, N.J.: Scarecrow Press, 1969. 234 pp.

Demonstrates the feasibility of an automated system that utilizes existing technology. Also discusses bibliographic search, acquisitions, circulated data, cataloging, and tying together local libraries (public, academic, and special), regional centers, and a National Library Central (perhaps the Library of Congress, which is already moving toward automation). Although this volume is largely technical, it is nevertheless important for suggesting what would more or less appear to be the inevitable shape of future information systems.

624. Educational Facilities Laboratories. *The Impact of Technology on the Library Building.* N.Y.: EFL, 1967. 20 pp.

A brief and competent summary of expert opinion concerning the impact of computers, microforms, and facsimile transmission on college library buildings.

625. Reynolds, John Donald. *The Future of Library Buildings: A Feasibility Study.* London: Library Associates, 1968.

626. Horn, Francis H. *The Future of the Library in Higher Education.* Carbondale: Southern Illinois University Library, 1958. 21 pp.

627. Schick, Frank L. (ed.). *The Future of Library Service: Demographic Aspects and Implications.* Urbana: University of Illinois, 1961. 286 pp.

A worthwhile collection of essays, discussion trends and possible futures for eleven types of libraries and six services within libraries.

628. Voigt, Melvin J. (ed.). *Advances in Librarianship.* Vol. I. N.Y.: Academic Press, 1970. 296 pp. $15.00.

629. "World of Libraries: Past, Present, Future." *Wilson Library Bulletin*, 43: February 1969.

630. Clapp, Verner Warren. *The Future of the Research Library.* Urbana: University of Illinois Press, 1964. 114 pp.

The Windsor Lectures in Librarianship. Of interest only to specialists.

631. Licklider, J. C. R. *Libraries of the Future.* Cambridge: MIT Press, 1965. 219 pp.

Technical discussion.

632. Horne, David, "The Changing World of Scholarly Books," *Publisher's Weekly*, July 17, 1967.

An authoritative short-range forecast by the Assistant Director of Harvard University Press. More books are foreseen involving syntheses and interdisciplinary approaches, concerned with current problems, and written by "shapers of ideas, of sensibility, of taste, of values." This shift in scholarly publishing may be a good indicator of future shifts in research foci and college curricula.

633. Escarpit, Robert. *The Book Revolution.* London: UNESCO and George G. Harrap, 1966. 160 pp.

634. Booher, Edward E., "Not Whether But How the Book Will Survive," *Publisher's Weekly*, June 9, 1969.

A forecast of the book industry to 1977.

635. Asheim, Lester (ed.). *The Future of the Book: Implications of the Newer Developments in Communications.* Chicago: University of Chicago, Graduate Library School, 1955. 105 pp.

Ten papers presented at the 20th Annual Conference of the Graduate Library School. Especially see "New Problems in Plotting the Future of the Book" by Asheim.

636. Baker, Dale B., "Communication or Chaos?", *Science*, 169: August 21, 1970, pp. 739–742.

The Director of Chemical Abstracts Service discusses information systems, the growing interdisciplinary nature of knowledge, and the "tremendous educational task" of making scientists, both young and old, aware of the power of the new information tools now becoming available and capable of using them effectively. Baker concludes that "the greatest challenge facing us in the 1970's is the coordination of the individual information systems into an effective information network for science and technology . . . a natural and necessary consequence of the integration of science itself."

637. "UMF and the Future," *Saturday Review*, April 19, 1969, p. 26.

An important editorial on the possible impacts of Ultramicrofiche (UMF), a new device "as far beyond microfilm as the microscope is beyond the magnifying glass." By representing 2,000 pages on a transparency smaller than a book page, "UMF will revolutionize the physical form of the library . . . (and) new libraries can be built at a fraction of the cost of present designs."

638. Tebbel, John, "Libraries in Miniature: A New Era Begins," *Saturday Review*, January 9, 1971, pp. 41–42.

A brief overview discussing the Microbook Library of Encyclopaedia Brittannica, the PCMI Library Information System of the National Cash Register Co. (utilizing UMF, or Ultramicrofiche), *The New York Times'* Information Bank, a new index from University Microfilms, and possible applications of cassette video players to books. "We are approaching a new era that will certainly revolutionize libraries, probably reading habits, and possibly even publishing itself . . . What the transistor is to radio and television, high reduction photography is to the printed page." Recommended.

639. Wittlin, Alma S. *Museums: In Search of a Usable Future.* Cambridge: MIT Press, 1971. $15.00.

640. Harrison, Molly. *Changing Museums.* N.Y.: Humanities Press, 1968. 110 pp. $2.25 paper.

E. ELECTRONIC MEDIA

641. Asimov, Isaac, "The Fourth Revolution," *Saturday Review*, October 24, 1970, pp. 17–20. (Part of special issue entitled "Toward The Global Village")

One of America's most prolific writers on science fiction and non-fiction topics, Asimov views the evolution of human communications in terms of four revolutions: speech, writing, the printing press, and electronic communications. We have advanced as far as we can in the world of the third revolution, and "The race is on between the coming of the true fourth revolution and the death of civilization that will otherwise inevitably occur through growth past the limits of the third." (p. 18) Although the first signs of the coming of the fourth revolution were to be noted in the mid-nineteenth century, this revolution is still "limited in scope and powerless to cause anything but fringe effects." Once truly established, however, Asimov envisions a worldwide electronic literacy, person-to-person communication on a scale of massive freedom, the library of mankind available to any man at any time, a personal immediacy that will justify the sense of a global village, lessened differences among men, English as the *lingua franca*, an "enormous" revolution in education with much learning in the home, uneducated peoples of the world leapfrogging into the culture of the fourth revolution, and cities spreading out and disappearing (thus alleviating the overconcentration which many times multiplies the impact of overpopulation).

642. Gattegno, Caleb. *Towards a Visual Culture: Educating Through Television.* N.Y.: Outerbridge & Dienstfrey, 1969. 117 pp. $4.95.

A serious essay of McLuhanesque proportions on the potentials of television in education: "a call to use television for what it can give, which is really tremendous and by most still unsuspected." (p. 4) ". . . only recently, through television, has (man) been able to shift from the clumsiness of speech . . . to the power of the dynamic, infinite visual expression . . . we can foresee the coming of an era where . . . we shall be able to share vast conscious experiences at once . . . The future is requiring that we learn to consider ever larger wholes in whatever social position we find ourselves . . . a visual culture is the answer to such a trend . . . sight is a far swifter means of experiencing and communicating than speech." (p. 5)

643. Youngblood, Gene. *Expanded Cinema.* With an Introduction by R. Buckminster Fuller. N.Y.: Dutton, 1970. 432 pp. $4.95 paper.

Argues that similar to the definition of man coming to mean man/plant/machine, the definition of cinema must also be expanded to include videotronics, computer science, and atomic light. Contents include radical evolution and future shock in the paleocybernetic age, the intermedia network as nature, global closed circuits, the earth as software, synaesthetics and kinaesthetics: the way of all experience, 2001: the new nostalgia, the technosphere, man/machine symbiosis, cybernetic cinema, computerfilms, the videosphere, etc.

644. McLuhan, Marshall. *Understanding Media: The Extensions of Man.* N.Y.: McGraw-Hill, 1964. 365 pp.

A much-discussed pot-pourri of ideas on past, present, and future. Subject to selective perception, in order to promulgate the view that "the medium is the message," and to considerable over-simplification, in order to classify media as hot or cool. Nevertheless, quite valuable if read selectively, especially for the major theme describing a transition from a linear and mechanical society of specialization to an electric society of concurrence and wholeness. Especially see the final chapter, "Automation: Learning a Living." (pp. 349–359)

645. Bagdikian, Ben H. *The Information Machines: Their Impact on Men and the Media.* N.Y.: Harper & Row, February 1971. 359 pp. $8.95.

The Assistant Managing Editor of *The Washington Post,* after two years at RAND, offers a broad overview on the collecting and daily delivery of information, largely through newspapers, television, and radio, and how our lives may be changed by the way we get our news in the future. The long-range significance of the primary new medium, cable television, is seen as its potential for outward communication. Concludes with the results of a 44-item Delphi exercise. Recommended.

646. Hellman, Hal. *Communications in the World of the Future.* N.Y.: M. Evans (distributed by Lippencott), 1970. About 180 pp. $4.95.

647. *Law and Contemporary Problems,* 34:2, Spring 1969 and 34:3, Summer 1969.

Two special issues on communications, including articles such as "Communications Technology—A Forecast of Change," "On the Impact of the New Communications Media upon Social Values," "International Communications: What Shape to Come?", etc.

648. Gans, Herbert J., "The Mass Media as an Educational Institution," Center for Urban Education, *The Urban Review,* 2:1, February 1967.

A challenging discussion of policy implications based on the premise that "both the school and the mass media are, in the broadest sense, political institutions competing for cultural power in the society." Because of "the media's demonstrated ability at engaging a child's interest and holding his attention more adequately than the school," it is suggested that "perhaps school learning should not be a compulsory process" and the school should become more audience-oriented. "The school's conception of the child, which developed in an era in which there was no democracy or equality for children . . . needs to be replaced." The conception of the teacher as a professional with a monopoly of knowledge "is no longer applicable in an era when the mass media have informed both children and parents." Recommended.

649. Rossi, Peter H. and Bruce J. Biddle (eds.). *The New Media and Education: Their Impact on Society.* Chicago, Aldine, 1966; Garden City, N.Y.: Doubleday Anchor, 1967. 460 pp.

Eleven articles by sociologists on recent and projected technological developments, and the impact of the new media on school systems, higher education, adult education, and the total society.

650. International Institute of Educational Planning. *The New Media: Memo to Educational Planners.* Paris: IIEP, 1967. 175 pp.

Based on a research project directed by Wilbur Schramm.

651. Geyelin, Philip L. and Douglass Cater. *American Media: Adequate or Not?* Washington: American Enterprise Institute for Public Policy Research (1200 17th St.). 1971. $5.75.

Part of the Rational Debate Seminars, containing views of the two spokesmen, their rebuttals, and their discussions with a seminar of informed experts, including the press.

652. U.S. Office of Education. *Educational Television: The Next Ten Years.* FS 5.234:34036. Washington: GPO, 1965. 375 pp.

653. Koenig, Allen E. and Ruane B. Hill (eds.). *The Farther Vision: Educational Television Today.* Madison: University of Wisconsin Press, 1969. 387 pp.

21 articles, including 2 on the future of ETV.

654. Carnegie Commission on Educational Television. *Public Television: A Program for Action.* N.Y.: Harper & Row, 1967; Bantam Books, 1967. 254 pp.

Advocates a significant expansion of public television.

655. Johnson, Leland L. *The Future of Cable Television: Some Problems of Federal Regulation.* Santa Monica: The RAND Corporation, 1970. 90 pp. $3.00 paper.

656. Tobin, Richard L. (ed.), "The Coming Age of News Monopoly," *Saturday Review*, Communications Supplement (Tenth Anniversary Issue), October 10, 1970, pp. 51–65.

Four articles discussing aspects of "an era in which more than 95% of all the daily newspapers in the United States will have no local print competition, where only two national newsgathering organizations will supply virtually everything broadcast over the average radio or TV station . . ." Especially see Fred W. Friendly's cautions about the impact of cable TV in "the wired city."

657. Mickelson, Sig, "The First Eight Years," *Saturday Review*, October 24, 1970, pp. 21–23. (Part of special issue entitled "Toward The Global Village")

An overview of developments in communications satellites, and the growing linkages between the developed and the developing world. While circuit capacity has vastly increased, cost continues to be lowered so that by 1975 it may be 25% of the 1968 figure. Direct-to-home communications through broadcast satellites may be technically feasible by the late 1970's.

658. The Twentieth Century Fund Task Force. *The Future of Satellite Communications.* N.Y.: Twentieth Century Fund (41 East 70th Street), 1970. $1.00.

"A committee of distinguished authorities . . . explodes the myth of communications satellite resource scarcity . . . finds unjustified the fear of propaganda and cultural imperialism . . . recommends new and simplified controls over satellite communications." (advt.)

659. Alpret, Hollis, "The Cassette Man Cometh"; Ivan Berger, "Someday Morning for the Culture Cans," *Saturday Review*, January 30, 1971, pp. 42–47.

Recent articles on the impending Cassette TV revolution, with the Berger article providing a chart of eleven competing systems, their expected dates of introduction in 1971 and 1972, and their technical attributes. Also see feature articles in *Life* (October 16, 1970, pp. 47–52), *The New York Times* (Sunday, July 5, 1970, Sec. 3, p. 1), and *Saturday Review* (August 8, 1970). Many other articles and books on cassettes will surely be published in the near future.

This new technology may prove to have a far greater impact on education than broadcast television, once the bewildered consumer makes a choice between Cartrivision, Videocassette, EVR, SelectaVision, Instavision, Videodisc, and other systems—all largely incompatible with each other. Ultimately we might see a national or global electronic university offering thousands of cassette courses that would make even the offerings of the multiversity appear meager.

660. Tebbel, John, "Network Television's Uncertain Future," *Saturday Review*, November 14, 1970, pp. 69–70.

A short essay on the possibility that "the communications industry may be plodding, like the dinosaur, toward extinction." Some data, depending on whose statistics one reads, suggest that television is actually losing its audience. Even more threatening are the prospects of cable television and cassettes. But Tebbel also suggests some possible negative consequences if network television does disappear, especially as concerns politics and binding the nation together. (For a more sanguine view of the TV networks, see *Business Week*, March 27, 1971, pp. 90–96).

V. Planning and Plans

A. FORECASTING METHODOLOGY

661. Gabor, Dennis. *Innovations: Scientific, Technological, and Social.* New York: Oxford University Press, March 1971. $4.95.

"Challenges the shallow assumptions, the obsolete commitments, and the automatic predictions of the fashionable 'futurologists' . . . This sensitive and finely balanced survey of human possibilities should release current thought about the future from its technocratic obsessions and bureaucratic compulsions." (Lewis Mumford in advt.)

662. Gabor, Dennis. *Inventing the Future.* London: Secker and Warburg, 1963; Penguin Books, 1964. 199 pp.

"The title of this book became the label of a world-wide movement of scientists and 'futurists' who maintained that the future ought to be chosen from many possible futures. Starting from the three great dangers which our civilization faces—nuclear war, overpopulation, and the Age of Leisure—a counter strategy is developed to mobilize man's ability not only to survive but to enjoy life . . . already considered to be a 'classic'." (Jantsch)

663. de Jouvenel, Bertrand. *The Art of Conjecture.* Translated from the French by Nikita Lary. New York: Basic Books, 1967. 307 pp. (First published by Editions du Rocher in 1964)

An authoritative discussion of "the customs of the mind in its commerce with the future," covering predictions, ways of conceiving the future, and quantitative predictions. The last chapter advocates "a surmising forum" as "a necessary response to a growing demand for forecasts." Recommended.

664. Polak, Fred L. *The Image of the Future: Enlightening the Past, Orienting the Present, Forecasting the Future.* Volume One (*The Promised Land, Source of Living Culture*, 456 pp.) and Volume Two (*Iconoclasm of the Images of the Future, Demolition of Culture*, 376 pp.). Leyden (The Netherlands): A. W. Sijthoff, 1961; N.Y.: Oceana, 1961. Translated from the Dutch by Elise Boulding. (Abridged translation, also by Boulding, to be published by George Braziller in 1971.)

"Argues that all major systems of history that have been in vogue during the last few centuries are incomplete in their time concepts. Hegel, Spengler, Schubart, Toynbee, Sorokin . . . regard the time flow as consisting of past and present only . . . The possible or probable future is for a considerable part already visibly here today. It is foreshadowed by the people's chosen images of the future . . . A modern and progressive restatement of what has been called the 'prophetic' approach to history." (book jacket abstract)

665. Jantsch, Erich. *Technological Forecasting in Perspective.* Paris: Organization for Economic Co-Operation and Development (OECD), 1967. 401 pp.

Extensive discussion of a framework for technological forecasting and related techniques. Of even greater importance are the two annexes. Annex A lists "Technological Forecasting Activities in Non-Industrial Environments," including 17 forecasting institutes and consulting firms (13 American), military and national planning in various nations, and forerunner activities in look-out institutions (9 of 13 listed are American). Annex B contains an annotated bibliography of about 420 items divided into 14 categories. Despite comprehensiveness in the area of scientific and technological forecasting, there is no mention of writings on educational futures or of organizations listed having such a concern. (For a more current listing of American futurists, see following item.)

666. McHale, John. *Typological Survey of Futures Research in the U.S.* Binghamton: State University of New York, Center for Integrative Studies, June 1970. 103 pp. Mimeo.

A survey of the current state of futures research programs in the United States, conducted for the National Institute of Mental Health during the

June 1969–June 1970 period, "in order to elicit a representative profile of such ongoing work, i.e., who is doing what, in which social sector, how it is being done and to which specific end(s)." (p. 1) Based on 135 usable returns (out of 356 letters sent out), McHale concludes that there are not more than 1000 full-time and less than 500 part-time workers in the field. (p. 19) Various charts and appendices list organizations, individuals, characteristics of the work, various definitions of futures research, communication needs, a discussion of the World Future Society, and informal change agencies that are actively creating alternative social arrangements. Although it is pointed out that this is not a directory or a social register of futurists, the study is nevertheless the best approximation for the time being.

Based on the returns (which undoubtedly characterize the mainstream), McHale concludes that the disciplines represented are heavily biased in the area of the physical sciences and engineering, which may tend "to push the overall developmental direction of the field towards 'professional respectability' and institutional propriety based on methodologies and models drawn from these areas . . . this direction if sustained may limit severely the 'look-out' and 'early-warning' capability of futures research." (p. 42) The age range concentration and sex ratio of the researchers also comes under criticism, and it is pointed out that "much of the work in this area is, indeed, tied closely to the traditional and largely unexamined premises for human action which are imbedded in our local ideological systems and value assumption. It is largely 'culture bound' in a period when one of the key aspects of ongoing change is the degree to which the more stereotyped socio-cultural premises . . . are undergoing considerable modification." (p. 43)

"One might conclude here that the potential contribution of futures research in the manifold service of the society is very great—but that present state of development, and the range of supported inquiry is not wholly conductive to the fullest use of that potential." (p. 45) Recommended.

667. Weaver, W. Timothy. *The Delphi Method*. Syracuse: Educational Policy Research Center, Working Draft, June 1970, 160 pp. Mimeo.

A three-part report with an extensive analysis of the experimental research that has proceeded and accompanied the development of the Delphi method, and its use as a device for technological forecasting and educational forecasting. Many reservations are made, and it is concluded that "Although Delphi was originally intended as a forecasting tool, its more promising educational application seems to be in the following areas: (a) a method for studying the process of thinking about the future, (b) a pedagogical tool which forces people to think about the future, and (c) a planning tool which may aid in probing priorities held by members and constituencies of an organization." (Also see summary article by Weaver in *Phi Delta Kappan*, January 1971, pp. 267–271)

668. Helmer, Olaf. *Social Technology*. N.Y.: Basic Books, 1966, 108 pp.

Discussion of Delphi technique and presentation of results from 1964 RAND study. "Social technology" proposed as an intellectual discipline in its own right, enabling "regular and systematic exploration and collation of expert opinion on the future, so that latest findings can be available to decision-making authorities." (This annotated bibliography essentially aims at the same direction by more conventional and less rigorous means.)

669. Rochberg, Richard, Theodore J. Gordon, and Olaf Helmer. *The Use of Cross-Impact Matrices for Forecasting and Planning*. Middletown, Conn.: Institute for the Future, IFF Report R–10, April 1970, 63 pp.

"A cross-impact matrix is an array consisting of a list of potential future developments and two kinds of data concerning these developments: first, the estimated probabilities that these developments will occur within some specified period in the future, and, second, estimates of the effect that the occurrence of any one of these events could be expected to have on the likelihood of occurrence of each of the others. In general, the data for such a matrix are obtained by collating expert opinions derived through the use of methods such as the Delphi technique. Such a matrix is analyzed in order to revise the estimated possibilities of occurrence of each development in light of the expected cross impacts of other events on the list, (and to) discover how a change in the probability of occurrence of one or more events (by virtue of a technological breakthrough, a social change, a policy decision) might be expected to change the probabilities of occurrence of other events on the list." (p. 1)

The possible benefits of such an approach are the prompting of meaningful questions, serving pedagogical purposes, comparing the plausibility of scenarios, providing a predictive device in areas in which exact causal relationships are extremely difficult to discern, and providing a method of stimulating certain policy actions. (p. 42)

This technical report of ongoing methodological development will probably be of interest only to specialists in forecasting. (Also see items no. 33 and 34 concerning IFF applications of the Delphi technique.)

670. U.S. Congress. House Committee on Science and Astronautics. *Technology: Processes of Assessment and Choice.* Report of the National Academy of Sciences. Washington: USGPO, July 1969. 163 pp. $.75.

"Technology Assessment" describes "what occurs when the likely consequences of a technological development are explored and evaluated. (The) objective is . . . to foster a more constructive evolution of our technological order." (p. 3) This authoriative report includes chapters on existing processes of assessment and decision, formulation of objectives, problems and pitfalls, and approaches and recommendations. It is concluded that new assessment mechanisms are needed with a broader and less self-interested viewpoint. To this end, "the panel urges the creation of a constellation of organizations, with components located strategically within both political branches, that can create a focus and a forum for responsible technology-assessment activities throughout government and the private sector . . . such organizations must be separated scrupulously from any responsibility for promoting or regulating technological applications . . ." (p. 117)

671. U.S. Congress. House Committee on Science and Astronautics. *A Study of Technology Assessment.* Report of the Committee on Public Engineering Policy, National Academy of Engineering. Washington. USGPO, July 1969. 208 pp. $1.25.

A summary of findings and commentary about the concept and practice of technology assessment, with three experiments and an analysis of the methodology employed. Of particular interest is the first experiment, Technology of Teaching Aids, where alternative strategies of using ETV and CAI in higher education and their impacts are explored. (pp. 37–76) Although these experiments are preliminary, they indicate the scope and direction of future efforts. It is concluded that tecnology assessments are feasible, and that they can help to alert the nation to future benefits and to future problems, if produced in an environment free from political influence or predetermined bias.

672. Blofeld, John (trans.) *I Ching: The Book of Change.* London: George Allen & Unwin, 1965: N.Y.: E. P. Dutton. 1966. 228 pp.

A new translation of one of the enduring books of the world, parts of which "are at the very least three thousand years old." Although scholarly, it is in "the simplest possible language," in contrast to the translation by Richard Wilhelm (with a sympathetic introduction by Carl G. Jung), which is compared on pp. 16–18. Blofeld claims that this method "enables any reasonably unselfish person who is capable of fulfilling a few simple conditions both to foresee and to control the course of future events." (p. 14) "I must make it clear that it is not one of those ordinary fortunetelling books which forecast future events and leaves us to sit back passively awaiting them. . . . It makes us architects of our own future, while helping us to avoid or minimize disasters." (p. 16)

"A really skilled interpreter who consults *The Book of Change* correctly will find that the answers given are NEVER WRONG!" (sic., p. 33) The problem is in acquiring skill in dealing with dividing sticks and the 64 hexagrams of Yin and Yang lines. The appropriate mental set is also necessary including a keenness of intuition, which Blofeld sees as increasingly neglected by the West. "This seemingly occult aspect of the book . . . is likely to call forth disbelief and even scorn from Westerners who have never put it honestly to the test. I have no means of convincing skeptics unless by asking them to test its power in all sincerity, which their very disbelief will make virtually impossible for them. Correct interpretations of the oracles requires a particular state of mind—here again, students of Zen possess a special advantage—in which respect based on belief is a vital factor." (p. 24)

Some Westerners in the "counter-culture" are devotees of this volume. Although Western futurists may be incapable of utilizing this method, it is well to nevertheless consider it as an alternative valued by many.

673. *The I Ching or Book of Changes.* The Richard Wilhelm translation rendered into English by Cary F. Baynes. Foreword by C. G. Jung. Preface to the Third Edition by Hellmut Wilhelm. Bollinger Series XIX. Princeton University Press, 1967. 740 pp. $6.00.

674. Legge, James (trans.). *I Ching. Book of Changes.* N.Y.: University Books, 1964; Bantam, 1969. 448 pp. $1.25.

For a shorter version of this translation, see Clae Walthon. *I Ching. The Chinese Book of Changes.* Arranged from the work of James Legge. N.Y.: Ace, 1969. $.95.

675. de Bono, Edward. *New Think: The Use of Lateral Thinking in the Generation of New Ideas.* N.Y.: Basic Books, 1968. 156 pp. $5.95.

This slim and simply written volume is easily as important as any of the ponderous tomes on rational methodology, which de Bono characterizes as "vertical thinking" or digging the same hole deeper. "Lateral thinking is based on biological information processing principles of which differ from the physical information processing principles of mathematics, logic, and computers." (pp. 1–2) It is not a magic formula, but an attitude and habit of mind. It is not a substitute for vertical thinking, but a complementary process. It is not simply creative thinking, which often requires a talent for expression, for it is open to everyone interested in new ideas.

The principles of lateral thinking involve the recognition of dominating ideas, the deliberate search for alternative ways of looking at things (which is not considered to be natural), relaxing the rigid control of vertical thinking, and the use of chance. Many examples are given from the hard sciences and from stage magic, which "takes advantage of people who use high probability or vertical thinking." Although no examples are given as to lateral thinking about society, education, or the future, this book is nevertheless quite appropriate to such concerns. (Also see Edward de Bono, "Zigzag Thinking," *The Futurist*, IV: 1, February 1970, pp. 29–31; *New Yorker*, April 5, 1971) Recommended.

676. Lewinsohn, Richard. *Science, Prophecy and Prediction.* N.Y.: Fawcett Publications, 1962. 304 pp. (Originally published in Germany, n.d.)

A popular but sober history of the art of prophecy, covering astrology, dream interpretation, election forecasting, weather forecasting, gambling, business cycles, etc. This book is a worthwhile overview of traditional methods, as opposed to several recent books written for the astrological/mystical audience, e.g., Harvey Day, *Seeing Into The Future* (Hollywood: Wilshire Book Co., 1967) and Edward Albertson, *Prophecy for the Millions* (Kingsport, Tenn.: Sherbourne Press, 1968).

677. Mannheim, Karl. *Ideology and Utopia: An Introduction to the Sociology of Knowledge.* N.Y.: Harcourt, Brace & World, 1968. 318 pp. (First published in 1936)

A classic essay that could prove of considerable value to the self-awareness of futurists. "A state of mind is utopian when it is incongruous with the state of reality within which it occurs." (p. 173) Chapter 4 discusses four forms of the utopian mentality: orgiastic chiliasm, the liberal-humanitarian idea, the conservative idea, and the socialist-communist utopia.

678. Bestuzhev-Lada, I., "Bourgeois 'Futurology' and the Future of Mankind," *Political Affairs: Journal of Marxist Thought and Analysis* (Theoretical Journal of the Communist Party, U.S.A.), September 1970, pp. 37–50.

Capitalists get their come-uppance here, for "it is common knowledge that it was Marxism which put the study of social concepts of the future on a scientific footing more than a century ago." (p. 37) Today, "Marxist-Leninist social prognostication" is opposing bourgeois futurology which plays the dual role of supplying economic and political strategy for imperialism as well as new arguments in the ideological struggle against

Communism. The prevailing thesis among Western writers is "that capitalism will not only survive the 20th century but will be capable of overcoming its inherent contradictions in the future." (p. 42) The author obviously thinks otherwise: "the principal result of the scientific and technological revolution of our time is the objective formation of the material prerequisites of the communist mode of production everywhere." (p. 49) Alternatives to capitalism/communism are not, of course, considered.

679. Krutch, Joseph Wood, "What the Year 2000 Won't Be Like," *Saturday Review*, January 20, 1968, p. 12+.

A brief and readable critique of much of the future-casting to date. "There are so many conflicting forces making for so many possibilities that there are a dozen possible futures, no one of which seems certain enough to justify saying 'This is what it is going to be like' . . . each prophet tends to concern himself almost exclusively with trends observable in his own field of study . . ." (p. 12)

680. Nisbet, Robert A., "The Year 2000 and All That," *Commentary*, June 1968.

A skeptical view of contemporary futurist activity, which is seen as no better and generally worse than the forays into the future that our great grandfathers made. "The only real utility of these fast accumulating reports and books on the future is the often enlightening, generally informative, sometimes brilliant perceptions they contain about the present."

681. Ziegler, Warren L., with the assistance of Michael Marien. *An Approach to the Futures-Perspective in American Education*. Syracuse: Educational Policy Research Center, May 1970. 103 pp.

A synthesis of the attempts to define alternative educational futures in the U.S., discussing the idea itself and the various methodologies in the macrosystem context of the educating domain, or "the education complex" (which includes the "periphery" of adult education, suppliers to educating institutions, and organized beneficiaries—especially students). Five planning models are discussed: the future-as-the-present, the future-as-an-extrapolation-of-the-present, the single alternative future, the technological future, and the comprehensive future. Problems in the policy, in policy-formulation, and in planning are discussed, and the document is concluded with two critiques by outsiders. Recommended.

682. Educational Policy Research Center at Syracuse. *Notes on the Future of Education*, 1:3, Fall 1970. Special Issue on Methodology.

Four brief articles discussing problems of planning and policy, the limitations of the Delphi method as a forecasting tool and its applications as an educational device, econometric modeling explained to the laymen, and macro-system forecasting (an exploratory paper suggesting a syncretic methodology combining general systems theory, social indicators, and forecasting in order to attain an overview of "the education complex").

683. Hirsch, Werner Z. and Colleagues. *Inventing Education for the Future*. San Francisco: Chandler Publishing Co., 1967. 353 pp.

19 articles arising from the 1965–66 Educational Innovations Seminar at UCLA. Largely concerned with methodology of planning and future-casting, and methods of introducing change.

684. Adelson, Marvin (ed.) with Marvin C. Alkin, Charles Carey, and Olaf Helmer, "Planning Education for the Future: Comments on a Pilot Study," *The American Behavioral Scientist* (Special Issue) 18:7, March 1967.

A multidisciplinary study entitled Innovation in Education, carried out at the UCLA Institute of Government and Public Affairs. Based on a Delphi exercise, with 93 proposed innovations arranged in a relevance tree format (p. 26), and an emphasis on allocative decisions. It was concluded that "the procedure was looked on by all of the participants as potentially very useful in educational planning at all levels." (p. 27)

685. Helmer, Olaf. *The Use of the Delphi Technique to Problems of Educational Innovations*. Santa Monica: The RAND Corporation, P-3499, December 1966.

686. Rosove, Perry E. *The Use of Contextual Mapping to Support Long-Range Educational Policy-Making*. Santa Monica: System Development Corporation, SP–3026, December 1967. 36 pp.

Discusses a method to display "logical and causal dependencies of functionally related phenomena" as concerns education. (See item 346 for an application of this method to future roles of educators)

B. PLANNING AND POLICYMAKING

687. Jantsch, Erich (ed.). *Perspectives of Planning.* Paris: Organisation for Economic Co-Operation and Development, September 1969. 528 pp. $12.00. (Available from OECD Publications Center, Suite 1207, 1750 Penna. Ave., Washington, D.C. 20006)

Proceedings o fthe OECD Working Symposium on long-range forecasting and planning, Bellagio, Italy, Fall 1968. "The present volume includes a general declaration agreed by all the participants, an impression of the content of the meeting by Dr. Erich Jantsch, who had organized it, the original papers as well as subsequent reflections by some of the authors. It is hoped that it will give some indication of the present state of development of this important but difficult subject and of its possible relevance in our technological societies." (OECD catalog)

688. Bauer, Raymond (ed.). *Social Indicators.* Cambridge: MIT Press, 1966. 357 pp.

"The focus of this volume is nothing less than the entire set of social indicators used in our society—statistics, statistical series, and all other forms of evidence—that enable us to assess where we stand and are going with respect to our values and goals, and to evaluate specific programs and determine their impact . . . Historically this book can be compared with the efforts of the economists thirty years ago to create a stable and useful set of economic indicators." (book jacket abstract)

689. Educational Policy Research Center at Stanford. *Toward Master Social Indicators.* Menlo Park, Calif.: Stanford Research Institute, Research Memorandum EPRC 6747–2, February 1969. 52 pp.

A discussion of social accounting, with particular emphasis on deriving master indicators (critical and aggregative indicators in hierarchical schema), relating indicators of individuals and social systems, and attaining "a comprehensive system of national social data capable of generating descriptive social reporting, projective social trending, and predictive social accounting." (p. 46)

690. Kahn, Alfred J. *Theory and Practice of Social Planning.* N.Y.: Russell Sage Foundation, 1969. 348 pp. $8.75.

Clarifies the major phases of the planning process: definition of the task, policy formulation, programming, evaluation and feedback, and discusses how planners cope with issues of fact and value. The role of futuristics is not considered. *Studies in Social Policy and Planning* (Russell Sage, 1969: 326 pp.), by the same author, is a companion volume providing case studies on the anti-poverty war, children in trouble, income security, community psychiatry, etc.

691. Ewing, David W. *The Human Side of Planning: Tool or Tyrant?* N.Y.: Macmillan, 1969, 216 pp.

A popularized discussion of tailoring programs to people and the job of the planning leader. Argues strongly for an emphasis on non-quantifiable variables, or the human side.

692. Williams, Walter. *Social Policy Research and Analysis: The Experience in the Federal Social Agencies.* N.Y.: American Elsevier, Policy Science Book Series, 1971. 210 pp. Approx. $17.50.

"Investigates the manner in which social science research techniques may be developed and used by policy makers of federal social agencies to improve anti-poverty and equal-opportunity programs. Analyses of a number of federal projects to aid the disadvantaged provided the factual background for this study." (advt.)

693. Dror, Yehezkel. *Public Policy-Making Re-examined.* San Francisco: Chandler, 1968. 370 pp.

An authoritative work discussing contemporary policy-making and proposing an optimal model characterized by rational and extrarational components. See Chapter 17. "Changes Needed in Knowledge" (and especially notes on policy science, pp. 240–245); also discussion in Chapter 19 on organizations for policy analysis. Excellent bibliographic essay, pp. 327–356. Recommended.

694. Dror, Yehezkel, "Policy Analysts: A new Professional Role in Government Service," *Public Administration Review*, 27:3, September 1967, pp. 197–203.

Advocates a new "policy science" interdiscipline, combining present methods of systems analysis with qualitative methods and a full awareness of the special characteristics of political phenomena. One of the essential features of policy analysis would be much more emphasis on futuristic thinking. Recommended.

695. Dror, Yehezkel. *Ventures in Policy of Sciences: Concepts and Applications.* Policy Sciences Book Series. N.Y.: American Elsevier, Summer 1971. Approx. 350 pp. and $16.50. (Includes a chapter on "A Policy Sciences View of Futures Studies")

696. Lasswell, Harold D. *A Pre-View of Policy Sciences.* N.Y.: American Elsevier, Policy Sciences Book Series, 1971.

697. Lindblom. Charles E. *The Policy-Making Process.* Englewood Cliffs, N.J.: Prentice-Hall, Foundations of Modern Political Science Series, 1968. 122 pp.

698. Conant, James Bryant. *Shaping Educational Policy.* N.Y.: McGraw-Hill, Carnegie Series in American Education, 1964, 139 pp.

Essays on the development of policy-making for public schools and higher education, with a close examination of New York and California. The advocacy of interstate cooperation for a "nationwide" educational policy (Chapter 5) was instrumental in the formation of the Education Commission of the States.

699. Bereday, George Z. F. and Joseph A. Lawerys (eds.). *Educational Planning.* The World Year Book of Education. N.Y.: Harcourt, Brace, and World, 1967. 442 pp.

A competent pre-PPBS, pre-futurist volume oriented to economic approaches.

700. Bowles, Samuel. *Planning Educational Systems for Economic Growth.* Cambridge: Harvard University Press, 1969. 245 pp. $7.00.

Discusses inputs and outputs, long-run demand for educated labor, a model for efficient allocation of resources, and alternative approaches to educational planning. The volume uses many examples from Northern Nigeria and Greece, based on the author's experience. The relevance to planning in post-industrial nations, however, may be limited.

701. Nozhko, et al. Educational Planning in the USSR. With Observations of an IIEP Mission to the USSR. Paris: UNESCO, International Institute for Educational Planning, 1968. 295 pp.

Especially see "Prospects for the development of education," pp. 173–176.

702. Webster, Maureen (comp.). *Educational Planning and Policy: An International Bibliography.* Syracuse: Educational Policy Research Center, June 1969. Working Draft. 654 pp.

Seeking to be comprehensive, international, and action-oriented, 4927 items are included—most of them published in the 1960's. An elaborate categorization is provided, with indexes by author, country and region. The six major categories are Education and National Development, Comprehensive and Partial Planning, Financing Educational Plans, Influences on Plan Targets, Productivity and Efficiency, and Bibliographies. An updated edition of about 8000 items will be published in Fall 1971, with a major shift in focus toward non-school education and alternative futures for learning. Recommended.

703. International Institute for Educational Planning. *Educational Planning: A Bibliography.* Paris: IIEP, 1964, 131 pp., annotated.

Probably outdated.

704. Anderson, C. A. *The Social Context of Educational Planning.* Fundamentals of Educational Planning 5. Paris: UNESCO, International Institute for Educational Planning, 1967. 35 pp.

705. Organisation for Economic Co-Operation and Development. *Methods and Statistical Needs for Education Planning.* Paris: OECD, 1967, 363 pp.

"Contains the results of a major effort to identify basic data needed for educational planning . . . Useful primarily for industrial countries with relatively good statistics." (Coombs)

706. Platt, William J. *Research for Educational Planning: Notes on Emergent Needs.* N.Y.: Unipub, Inc., 1970. $2.00.

Based on background documentation prepared for a workshop sponsored by the International Institute for Educational Planning.

707. *Educational Planning: A World Survey of Problems and Prospects.* N.Y.: Unipub, Inc., June 1970. $4.50 paper.

708. Elam, Stanley and Gordon Swanson (eds.). *Educational Planning in the United States.* Itasca, Ill.: Peacock, 1969. 216 pp. $650.

"A detailed examination of planning in U.S. schools from a long-range, multidisciplinary, worldwide perspective. It tells what is to be planned, how planning can be done, who is to do it, and what planning may achieve." (advt.)

709. Morphet, Edgar L. and David L. Jesser. *Cooperative Planning for Education in 1980: Objectives, Procedures, and Priorities.* (Designing Education for the Future. Vol. 4) N.Y.: Citation Press, 1968. 105 pp.

Four articles concerned with prospective changes in society and the implications for educational planning. Recommended.

710. Davis, Russell G. *Planning Human Resource Development: Educational Models and Schemata.* Chicago: Rand McNally, Education Series, 1966. 334 pp. Bib., pp. 311–322.

A technical approach utilizing flow, output, and cost measures. Bibliography of about 165 items on education and educational planning.

711. National League of Cities. *Education and Manpower Strategies and Programs for Deprived Urban Neighborhoods: The Model Cities Approach.* Washington: National League of Cities, 1968.

Report of workshop held to identify effective strategies for planning, initiating and coordinating comprehensive deprived neighborhood manpower and education programs.

712. Miller, Donald R. and Jerry J. Donovan (comps.). *A Selected Bibliography of Planning-Programming-Budgeting Systems (PPBS) in Education.* Burlingame, Calif.: OPERATION PEP: A Statewide Project to Prepare Educational Planners for California, March 1970. 92 pp.

About 1200 items arranged alphabetically with no categorizations or annotation.

713. Hartley, Harry J. *Educational Planning-Programming-Budgeting: A Systems Approach.* Englewood Cliffs: Prentice-Hall, 1968. 290 pp. $7.95.

An authoritative work aimed at legitimizing the PPB system for local school districts, and suggesting the state of non-future-thinking at the time of writing. Although heralded as an important step in the evolution of budgeting practice in the late 1960's, there is now a question as to when—if at all—PPBS will be truly adapted.

714. Churchman, C. West. *The Systems Approach.* N.Y.: Dell Publishing, Delta Books, 1968. 243 pp. $2.25.

A non-technical introduction to systems, systems thinking, the systems approach to the future, and the systems approach and human beings The book examines four different ideas as to what really constitutes *the* systems approach, juxtaposing them in the context of a debate between the advocates of efficiency, the scientists, the humanists and the anti-planners.

715. Hoos, Ida R., "Systems Analysis as a Technique for Solving Social Problems: A Realistic Overview," *Socio-Economic Planning Sciences*, 4:1, March 1970, pp. 27–32.

A severe critique of "the mixture of salesmanship and politics which dominates the applications of systems analysis . . . systems studies are a handy political tool. They can justify an ideological position by strategic inclusion or exclusion of pertinent data; they can provide simplistic solutions to complex problems."

716. Meals, Donald, "Heuristic Models for Systems Planning," *Phi Delta Kappan*, 48:5, January 1967.

An explanation of the systems approach to policy-making: "Above all else, the systems approach is an attitude of mind—a way of seeing the world."

717. Banghart, Frank W. *Educational Systems Analysis.* N.Y.: Macmillan, 1969. 330 pp.

A scientific discussion of management and decision-making, with assumptions such as "The problem in any type of systems activity is to retain the integrity of the system and to try to minimize the tendency of the system to degenerate." (p. 35) There is no discussion of system lag or change, and this book is therefore better characterized as a treatise on systematic analysis rather than the analysis of a system (which necessarily requires an analysis of the environment in time and space).

718. Pfeiffer, John. *New Look at Education: Systems Analysis in Our Schools and Colleges.* N.Y.: The Odyssey Press, 1968. 162 pp.

A popularized overview of gaming, planning, and the Delphi technique.

719. National Education Association. *Rational Planning in Curriculum and Instruction: Eight Essays.* Washington: NEA Center for the Study of Instruction, 1967. 203 pp.

720. Leu, Donald J. *Planning Educational Facilities.* N.Y.: Center for Applied Research in Education, 1965. 115 pp.

A summary of recent trends in school buildings (pp. 4–6), and a final chapter entitled "A Look into the Future" in which it is stressed that educational facilities should be geared to changes in prograsm. Note that the "little school" concept of satellites around a servicing core (p. 104) parallels the "cluster college" concept at higher levels.

721. Glenny, Lyman A., et. al. *A Survey of Research and Perspectives on National Planning for Higher Education.* A Report to the Academy for Educational Development. Berkeley: Center for Research and Development in Higher Education, May 1969. 56 pp. Mimeo.

Results of visits and interviews with key staff members of about three dozen research agencies "considered to have a potential for conducting research of high quality which could contribute to national planning efforts."

722. Berve, Nancy M. *Present Planning for Higher Education.* Studies in the Future of Higher Education, Report No. 1. N.Y.: Academy for Educational Development, July 1967. 275 pp.

The first in a series of studies conducted under contract with the National Institutes of Health, with cosponsorship by the U.S. Office of Education, the National Science Foundation, and the Public Health Service Bureau of Health Manpower. Presents a two-page summation of higher education planning for each of the states, and listings of new institutions, regional associations, organizations involved in higher education planning, legal mechanisms for planning, etc.

723. Williams, Harry. *Planning for Effective Resource Allocation in Universities.* Washington: American Council on Education, 1966. 78 pp.

A discussion of conventional budgeting compared to program budgeting. The higher education equivalent of Hartley's book (Item no. 713). Unannotated bibliography of 35 items, pp. 77–78.

724. Knorr, Owen A. (ed.). *Long Range Planning in Higher Education.* Boulder, Colo.: WICHE, April 1965. 128 pp.

Eight articles on various aspects of planning, based on the sixth annual Institute on College Self-Study. Bibliographies are provided at the end of each chapter, with about 150 items in all. Especially see p. 51 for a bibliography of 24 state plans and planning documents prepared in the 1958–1964 period.

725. McGrath, Earl J. (ed.). *Cooperataive Long-Range Planning in Liberal Arts Colleges.* Published for the Institute of Higher Education. N.Y.: Teachers College, 1964. 108 pp.

A nuts and bolts examination of admissions policy, tuition, institutional research, etc., with no consideration of broad trends and futures. Dull and outdated.

C. PLANNING FOR CHANGE IN EDUCATION

726. Morphet, Edgar L., and Charles O. Ryan (eds.). *Planning and Effecting Needed Changes in Education.* Designing Education for the Future: An Eight-State Project, Reports Prepared for the Third Area Conference. Denver, Colo.: June 1967. 317 pp.

26 articles, largely by professional educators, on planning for and effecting change in schools, school systems, metropolitan areas, and at the state level. Vol. 3 of a continuing series.

727. Havelock, Ronald G., and Others. *Planning for Innovation: Through Dissemination and Utilization of Knowledge.* Ann Arbor: University of Michigan, Institute for Social Research, Center for Research on Utilization of Scientific Knowledge, 1970 (?). 538 pp. $8.00 paper.

A review and integration of the relevant literature on innovation, dissemination, and knowledge utilization.

728. Havelock, Ronald G., Janet C. Huber, and Shaindel Zimmerman (comps.). *Major Works on Change in Education: An Annotated Bibliography*

With Author and Subject Indices. Ann Arbor: University of Michigan, Institute for Social Research, Center for Research on Utilization of Scientific Knowledge, October 1963. 60 pp. $1.00 paper.

39 items, largely anthologies, with a detailed indexing of contributing authors and topics, and a brief critical annotation for each volume.

729. Watson, Goodwin (ed.). *Concepts for Social Change.* Washington: National Training Laboratories, National Education Association, 1967. 88 pp. *Change in School Systems.* Washington: NTL, NEA, 1967. 115 pp.

These companion volumes provide direction to the Cooperative Project for Educational Development (COPED). The first volume has seven papers developing the core ideas about planned change. The second volume focuses attention "on the special properties and processes of the schools and on strategies for change designed to test and develop the core ideas."

730. Miller, Richard I. (ed.). *Perspectives on Educational Change.* N.Y.: Appleton-Century-Crofts Division of Meredith Publishing Co., 1967, 392 pp.

16 articles on facilitating innovation. According to the editor, "Deep and strong beliefs in the democratic way, equality of opportunity, material progress, and education form the milieu for change in education." (p. 5)

731. Kurland, Norman D., and Richard I. Miller (comps.). *Selected and Annotated Bibliography on the Processes of Change* (1966 Edition). Albany: New York State Education Department, Center on Innovation. 41 pp.

Categorized by academic discipline, with about forty items on education.

732. Miles, Matthew B. (ed.). *Innovation in Education.* N.Y.: Columbia University, Teachers College, Bureau of Publications, 1964. 689 pp.

733. Carlson, Richard O., et al. *Change Processes in the Public Schools.* Eugene, Oregon: The Center for the Advanced Study of Educational Administration, University of Oregon, 1965. 92 pp.

Report of a 1964 seminar which "had as its main objective the enhancement of the school official's understanding of the planned change processes and of their skills in carrying out planned change." Organization theory perspective; probably outdated because of new methods and concepts.

734. Mayhew, Lewis B. *Innovation in Collegiate Instruction Strategies for Change.* Atlanta: Southern Regional Educational Board, SREB Research Monograph No. 13, 1967. 48 pp.

Discusses several techniques, including the "sociological stranger" or outside consultant, and the role of the president's leadership.

D. STATE-LEVEL PLANNING AND REPORTS

735. Furse, Bernarr, and Lyle O. Wright (eds.). *Comprehensive Planning in State Education Agencies: A 7-State Project.* Salt Lake City: Utah State Board of Education, 1969.

An important compendium of reports from six states (Utah, Colorado, Texas, Iowa, West Virginia, Connecticut) and Puerto Rico, as developed under Section 505 of Title V, ESEA. The outlines of a future statewide coordination of *all* educating institutions (including those in non-degree-credit activity) can be seen in several states, especially Utah.

736. Advisory Council on the State Departments of Education. *Focus on the Future: Education in the States.* Washington: USGPO, 1968. 57 pp.

"Concentrates its major attention on the future development of State educational agencies through the comprehensive educational planning process." (GPO brochure)

737. Central Advisory Council for Education (England). *Children and Their Primary Schools. Vol. 1: Report; Vol. 2: Research and Surveys.* London: Her Majesty's Stationary Office, 1967. 556 pp. and 633 pp. respectively. Vol. 1 $4.95; Vol. 2 $5.85. (May be ordered from Sales Section, British Information Services, 845 Third Ave., New York, N.Y. 10022)

Known as "The Plowden Report," this thorough and comprehensive study looks at "primary education in all of its aspects and the transition to secondary education." The following are but a few of the many conclusions and recommendations: a higher priority in the educational budget should be given to primary schools (for dollars spent on older children will be wasted if not spent on them during their primary years); "Finding Out" has proven to be better for chilren than "Being Told"; family background is important; half-time education for 3 and 4 year olds should be provided to ease the transition from home to school; and learners must develop self-confidence in early years. Recommended.

738. *Living and Learning. The Report of the Provincial Committee on Aims and Objectives of Education in the Schools of Ontario.* Toronto: Ontario Department of Education (44 Eglinton Avenue West), 1968. 221 pp.

A lovely document, summarizing a wide array of literature and special reports, written cogently and forcefully, and amplified by photographs and drawings. The Committee arrived at two fundamental principles: a) the right of every individual to have equal access to the learning experience best suited to his needs, and b) the responsibility of every school authority to provide a child-centered learning continuum that invites learning by individual discovery and inquiry. (p. 179) Based on these principles, 258 recommendations are made in four broad categories reflecting the sequence of the report: The Learning Program, Special Learning Situations, The World of Teaching, and Organizing for Learning. The appropriate body for consideration and action is listed with each recommendation. Recommended.

739. *Plan for Educational Development for North Dakota, 1967–1975.* Bismarck, N.D.: State Superintendent of Public Instruction, State Capitol (6 vols.), 1968.

Deals with all phases of elementary and secondary education and with teacher education. Among the recommendations was a proposal for a new kind of elementary teacher preparation program, leading to the New School of Behavioral Studies in Education at the University of North Dakota, as an instrument for constructive change in the state's schools. (See "A description of the New School, University of North Dakota." Grand Forks, N.D. 58201: The New School, May 1970. 19 pp. Mimeo.)

740. Nadel, Aaron B., et. al. *The Future Requirements of Public Education in California.* Prepared for the State Committee on Public Education, State of California, under contract with General Learning Corporation. Sacramento: State Education Department, January 1967. 66 pp.

After a brief look at future technological developments and urbanization, this document examines population, manpower requirements, and fiscal requirements for education at elementary and secondary levels only. Concludes that "It is quite evident that educational planning must interact with economic planning, both at state and local levels." A broader perspective, however, woud suggest that educational planning should interact with far more than simply economic planning; it is therefore questionable whether "The Future Requirements of Public Education in California" have been adequately explored here.

741. Academy for Educational Development. *Looking Ahead to Better Education in Missouri.* St. Louis, 1966.

742. Task Force on Education. *Education for the Future of Illinois.* Springfield: State of Illinois, 1966.

743. *Report of the Royal Commission of Inquiry on Education in the Province of Quebec* (5 vols). Printer for the Government of Quebec, 1963–1966.

744. *Report of the Royal Commission on Education*, Province of British Columbia. Victoria: Queen's Printer, 1960.

745. *Report of the Royal Commission on Education and Youth*, Vol. 1. Province of Newfoundland and Labrador, 1967. St. Johns: Queen's Printer, 1967.

746. Mayhew, Lewis B. *Long Range Planning for Higher Education.* Studies in the Future of Higher Education, Report No. 3. N.Y.: Academy for Educational Development, May 1969. 221 pp.

An authoritative assessment of statewide coordination systems for higher education and resultant master plans, voluntary coordination, and long-range planning of individual institutions. "Only 10 states have no master plans, higher education studies with the attributes of a master plan, or definite activities designed to result either in a master plan, or some form of coordinating agency." (p. 1) But, although "the movement towards planning seems inexorable" (p. 1), of the ten non-planning states, "all seems unlikely, for a wide variety of reasons, to produce master plans." (p. 101) There is a great similarity among the states that plan and the unquestioned assumptions that plans are based on. Mayhew aptly questions a number of these assumptions, but not in terms of alternative future states of society. Rather, in his final chapter on "The Future of American Higher Education," "the outlines of American society for 1980 are reasonably clear." (p. 172) Clarity is provided by extrapolation of various demographic trends, and a scenario of relatively little change in higher education.

747. *The First Business of Our Times.* A Report to the Advisory Commission for the Higher Education Study—State of Maine. N.Y.: Academy for Educational Development, September 1966.

748. *Kansas: Plans for the Next Generation.* A Report on Higher Education to the Board of Regents. N.Y.: Academy for Educational Development, November 1962.

E. INSTITUTIONAL SELF-STUDIES

749. *Quality Education in Milwaukee's Future: Recommendations to the Citizen's Advisory Committee to Comprehensive Survey of Milwaukee Public Schools and the Milwaukee Board of School Directors.* N.Y.: Academy for Educational Development, August 1967.

750. Ladd, Dwight R. *Change in Educational Policy: Self-Studies in Selected Colleges and Universities.* A General Report Prepared for The Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, 1970. 231 pp. $5.95.

Brief but well-drawn case studies of the collegial process of attempted reform at Berkeley, New Hampshire, Toronto, Swarthmore, Wesleyan, Michigan State, Duke, Brown, Stanford, Columbia, and UCLA. "While the scope and degree of the proposed changes vary, all have in common the use of the traditional, collegial process of study, analysis, discussion, and debate leading to a decision based on general acceptability. . . . Unhappily, the results of these studies seem to lend support—at least in a negative way—to the efficacy of pressure politics as a way of bringing about change." (p. 197)

"The situations reviewed here suggest that these studies have rarely succeeded in bringing about any fundamental change in educational policies on the campuses involved except where a significant portion of the faculty had accepted the desirability of some change before the study began or where pressures for change from outside the faculties were much in evidence." (p. 200)

"It is quite obvious that we can have personnel policies and purchasing policies and library policies in any university, however large. All large bureaucracies have these. What is less obvious after examination of these studies is whether or not large institutions can have *educational* policies—whether the American tradition of giant institutions has not, in the case of higher education, reached the point of diminishing returns." (concluding comment, p. 209) Recommended.

751. Massachusetts Institute of Technology, Special Faculty-Student Commission. *Creative Renewal in a Time of Crisis.* Cambridge: MIT Press, November 1970. 234 pp.

Recommends revision of freshman and sophomore curriculums, greater opportunities for individual study, greater attention to the social consequences of science, and taking seriously the intellectual problem of defining the relation of knowledge to values.

752. University of California, Berkeley Academic Senate. *Education at Berkeley: Report of the Select Committee on Education.* Berkeley: University of California Press, March 1966. 228 pp. $6.50; $1.95 paper.

As a response to the widely publicized events of 1964, "The Muscatine Report" offers a plethora of recommendations in areas of teaching, admissions, advising, grading, graduate education, organizational structure, and teaching assistants.

753. Christenson, Gordon (ed.). *The Future of the University.* A Report to the People by the Executive Planning Committee of the University of Oklahoma. University of Oklahoma Press, 1969.

The results of a year-long study to re-evaluate the university's mission, organization, and resources.

754. Duke University Committee on Long-Range Planning. *Duke University in the Decade Ahead.* Durham: The University, June 1961.

755. London University. *The University of Birkbeck College: Report of the Academic Advisory Commission on Birkbeck College.* London: University of London, May 1967. 87 pp.

Self-study of a non-resident adult education college of the University of London and its role in meeting future demand.

756. University of Oxford, Hebdomadal Council, Commission of Inquiry. *Report of Commission of Inquiry* (2 vols.). Oxford: University of Oxford Press, 1966. 428 and 486 pp. respectively.

An extensive institutional self-study in response to the "Robbins Report." Most recommendations appear to be of local concern.

757. Daiches, David (ed.). *The Idea of a New University: An Experiment in Sussex.* London: Andre Deutsch, Ltd., 1964; Cambridge, Mass.: MIT Press, 1970. 272 pp. $2.95 paper.

Twelve essays, not only concerned with getting the University of Sussex underway, but with the planning and design of any new university in all of its aspects, covering fundamental questions of location, size, content, and teaching methods. A short "Afterword" written in 1969 looks back on the essays written in 1964 and the experience of the University since it opened in 1961.

758. Patterson, Franklin and Charles R. Longsworth. *The Making of a College: Plans for a New Departure in Higher Education.* Hampshire College, Working Paper No. 1 Cambridge: MIT Press, 1966. 364 pp. $4.95 paper

Planning papers for a new liberal arts college in South Amherst, Mass., which "defines an organized vision of liberal education for a new era . . . to help its students learn to live their adult lives fully and well in a society of intense change, immense opportunity, and great hazards." Recommended.

759. Five College Long Range Planning Committee. *Five College Cooperation: Directions for the Future.* Amherst: University of Massachusetts Press, 1969. 228 pp. $5.00 paper.

Composed of representatives from Smith, Hampshire, Amherst, Mt. Holyoke, and the University of Massachusetts, the LRPC was appointed "to make an extensive review of present cooperative arrangements among the five institutions, assess their strengths and weaknesses, propose long-range goals for cooperation, and establish priorities among actions required to reach these goals." (p. 1) Concludes with 89 recommendations in 11 categories: academic complementarity, cooperative academic programs and activities, student course exchange, the four-one-four calendar, supplementary academic activities, coeducation and cooperation, student life, cooperative planning and use of facilities and services, community relations and public service, governance, and the economic consequences of cooperation.

As of 1965, 1017 consortiums were identified among 1509 responding institutions. (Raymond S. Moore, *Consortiums in American Higher Education.* Washington: USOE, September 1968.) There will surely be more cooperation in the future, forced by economic necessity and encouraged by resulting learning opportunities. The present arrangements and plans of the well-established Connecticut Valley consortium may very well serve as a harbinger of the future. Recommended.

F. EDUCATION-RELATED ORGANIZATIONS

760. Voss, John and Paul L. Ward (eds.). *Confrontation and Learned Societies.* N.Y.: New York University Press, 1970. 144 pp. $5.00.

Sponsored by the Conference of Secretaries, American Council of Learned Societies. Analyze causes of disruption at recent annual meetings, and the responsibilities of learned societies to this dissent.

761. Krumboltz, John D. (ed.). *Revolution in Counseling: Implications of Behavioral Science.* Boston: Houghton-Mifflin, 1966. 121 pp. $2.25.

Based on the 1965 Cubberly Conference at Stanford. One of the contributors characterizes the book as "the first major attempt to propose systematically the application of behaviorism, and of operant conditioning particularly, to the counseling process." (p. v) But the "revolution" is merely one proposed tocolleagues, and the outside world awaits.

762. *Phi Delta Kappa Looks to the Future.* Final Report of the Committee for the Study of Phi Delta Kappa (Preliminary Draft), December 1965. 123 pp. Mimeo.

The society for professional educators assesses trends, its present state, and future conditions in a rapidly changing world—resulting in the advocacy of a wide array of new policies, purposes, and objectives. A good example of an organization adapting to the times.

763. "Where Does the AFT Go From Here? (An Epilogue)." *Changing Education—A Journal of the American Federation of Teachers,* Summer 1966, p. 47.

A concluding statement in a special issue entitled "AFT: A 50-Year Assessment," notable for its total absence of any sense of the future. The "old liberal" goals of collective bargaining for teachers and civil rights for all Americans continue to be advocated. "The answer to the future effectiveness of the Union in meeting these challenges lies in its ability to increase its support and influence among teachers."

764. "AAUW and The Future." *American Association of University Women Journal* (Special Issue), 57:4, May 1964.

Conceived as an attempt to examine and elucidate the Federal Legislative Program of the Association: "to look ahead at some of the trends we may have to consider in the future." As a good example of openness, see the article by Ina Corinne Brown, "Do We Need a New Map of Reality?"

765. Locke, Robert W., "Has the Education Industry Lost Its Nerve?", *Saturday Review*, January 16, 1971.

An assessment of the states of the industry and its dampened enthusiasms for the moment.

VI. MISCELLANEOUS

A. PRE-1960 FORECASTS

766. Starrett, Helen Ekin. *The Future of Educated Women.* Chicago: Jansen, McClurg, & Co., 1858. 75 pp.

A "Woman's Lib" essay on the benefits and difficulties of the educated woman

767. Dewey, John. *The School and Society.* Chicago: University of Chicago Press, November 1899; Revised Edition, August 1915. 159 pp.

A classic essay describing the "New Education" in the light of larger changes in society, and attacking "the isolation of the various parts of the school system." Much, though not all, is still relevant to today's proposals for alternative futures, e.g., "The statement so frequently made that education means 'drawing out' is excellent if we mean simply to contrast it with the process of pouring in (p. 36); "The pupil must learn what has meaning, what enlarges his horizon instead of mere trivialities." (p. 78)

768. Dewey, John and Evelyn. *Schools of Tomorrow.* N.Y.: E. P. Dutton & Co., 1913. 316 pp.

769. Cubberly, Ellwood P. *Changing Conceptions of Education.* Boston: Houghton-Mifflin, 1909. 70 pp.

After reviewing Changes in the Nature of our Life and Changes in the Conception of the School, Cubberly contends that "We are standing on threshold of a new era in educational progress." (p. 52)

"To convey to the next generation the knowledge and accumulated experience of the past is not (the school's) only function. It must equally prepare the future citizen for the tomorrow of our complex life . . . There are many reasons for believing that this change is taking place rapidly at present . . ." (p. 54) Needless to say, the glowing optimism has proved to be unwarranted.

770. Kilpatrick, William Heard. *Education for a Changing Civilization.* Three Lectures Delivered on the Luther Laflin Kellogg Foundation at Rutgers University, 1926. N.Y.: Macmillan, 1936. 143 pp.

Even though conceived nearly half a century ago, these lectures by an eminent "Progressive" are in many respects not unlike the prescriptions advocated by today's reformers. (It is not that present writers have been influenced by Kilpatrick, but rather that an anticipation of change leads to similar educational prescriptions.)

Observing that "Our young people face too clearly an unknown future" (p. 41), and "Our youth no longer accept authoritarian morals" (p. 50), it is recommended that "We must free our children to think for themselves." Older education is seen as pretending that the future will be like the present, but "no longer can one generation bind the next to its solutions. On the other hand, our young people must learn such general and flexible techniques as promise best to serve them in that unknown future." (p. 85)

But rhetoric and reality become confused when its is asserted (similar to Cubberly) that "Our schools are already changing" (p. 89), based on scattered impressions of less group precision and "straight line march-ing," more individual movement, school as a place where "actual experiencing goes on" and the fact that "the better schools now favor student participation in school affairs." (p. 107) Does this all sound familiar? Recommended.

771. Russell, Bertrand. *The Scientific Outlook.* Glencoe, Ill.: The Free Press, 1931. 277 pp.

The final section of the book (pp. 203–273) discusses "The Scientific Society" . . . "an attempt to depict the world which would result if scientific technique were to rule unchecked." (p. 260) Education is discussed as the provision of one kind of education for the scientific elites and another for the ordinary people. "Ordinary men and women will be expected to be docile, industrious, punctual, thoughtless, and contented . . . all the researches of psycho-analysis, behaviorism, and biochemistry will be brought into play . . . all the boys and girls will learn from an early age to be what is called 'cooperative' . . . formal lessons, in so far as they exist, will be conducted by means of the cinema or the radio, so that one teacher can give simultaneous lessons in all the classes throughout a whole country." (pp. 243–244)

772. Eurich, Alvin C. (ed.). *The Changing Educational World, 1905–1930.* Minneapolis: University of Minnesota Press, 1931. 311 pp.

Article on trends in vocational education and all levels of formal education.

773. Counts, George. *Dare the School Create a New Social Order?* N.Y., John Day, 1932. 56 pp.

A classic polemic, obviously unheeded. The modern reformulation might be "dare the social order create a new school?" although others might see a chicken-egg question.

774. *Educational Planning for the Future.* Progressive Education Booklet No. 4. Columbus, Ohio: American Education Press, 1937. 28 pp.

Three essays having little or nothing to do with planning or the future.

775. Maritain, Jacques. *Education at the Crossroads.* New Haven: Yale, 1943. 120 pp.

The 1943 Terry Lectures at Yale. (Not seen, but according to one critic it has many of the anticipations of Reich's *Greening of America.*)

776. Berkson, Isaac. *Education Faces the Future: An Appraisal of Contemporary Movements in Education.* N.Y.: Harper, 1943. 345 pp.

777. Brameld, Theodore. *Design for America: An Educational Exploration of the Future of Democracy For Senior High Schools and Junior Colleges.* N.Y.: Hinds, Hayden & Eldredge, 1945. 165 pp.

A report of a futures curriculum project in Floodwood, Minnesota undertaken during World War II with the prospect of reconstruction ahead. A curriculum is described for three broad areas: Economic-Political, Art and Science, and Education and Human Relations, with a bibliography at the end of each section; in all more than 200 items of largely prescriptive social futures circa World War II.

778. National Education Association, Educational Policies Commission. *Planning for American Youth: An Educational Program for Youth of Secondary-School Age.* Washington: National Association of Secondary School Principles, 1951. 63 pp.

A summary of *Education for All American Youth* (1944), presenting three models of good schools in mythical communities of Farmville, Frost County (rural area), and American City—all in the imaginary state of Columbia. The prospect is pure sweetness and light, without the slightest hint of race, financial problems, or urban decay.

779. Fine, Benjamin. *Our Children Are Cheated: The Crisis in American Education.* N.Y.: H. Holt, 1947. 244 pp.

Originally a series of twelve articles in the *New York Times*, this exposé is based on a nationwide tour by the author, who discovered teacher shortages, substantard teachers (as measured by credentials), educational inequality, and physical disintegration of school plants. Concludes with 14 recommendations, including higher teacher salaries and standards, assistance from the federal government, better health programs, and smaller classes. Most of these reforms have taken place, but there is perhaps an even greater crisis at present, as new issues and dissatisfactions have developed. This book might well be seen as the 1947 equivalent of Charles E. Silberman's *Crisis in the Classroom* (item 243).

780. Bestor, Arthur E. *Educational Wastelands: The Retreat from Learning in Our Public Schools.* Urbana : University of Illinois Press, 1953. 226 pp.

An educator decries the vanishing sense of purpose and proposes an ideal of Disciplined Intelligence, and a Permanent Scientific and Scholarly Commission on Secondary Education.

781. Kangel, Isaac L. *The New Era in Education: A Comparative Study.* Boston : Houghton-Mifflin, 1955. 388 pp.

Trends in world education.

782. Stoddard, A. J. *Schools for Tomorrow: An Educator's Blueprint.* N.Y.: Fund for the Advancement of Education, 1957. 61 pp.

"Of special historical interest . . . this booklet is widely accepted as a prophetic view of things to come." (Coombs)

783. Schilpp, Paul Arthur (ed.). *Higher Education Faces the Future: A Symposium on College and University Education in the United States of America.* N.Y.: H. Liveright, 1930. 408 pp.

20 essays discussing various problems, but no attempt to look at the future.

784. Foerster, Norman. *The Future of the Liberal College.* N.Y.: D. Appleton-Century, 1938. 103 pp.

Advocates a vigorous reassertion of the perennially distinctive mission of the liberal arts college. Devoid of any social context in the present or the future.

785. Fraser, Mowat G. *The College of the Future: An Appraisal of Fundamental Plans and Trends in American Higher Education.* New York: Columbia University Press, 1937. 529 pp.

786. Conant, James B. "The Future of our Higher Education," *Harper's*, 176: May 1938, pp. 561–570.

An overview of problems. Although initially indicating that he will be prophetic, Conant goes on to advocate a desirable future knitting together aristocratic and democratic traditions in correct proportions.

787. Hughes, R. M. "Higher Education in 1980," *Journal of Higher Education*, 14:2, February 1938, pp. 77–83.

Enrollment estimates speculating that by 1965, 60% of high school graduates will enter college. This estimate proved to be high, while the estimate of births proved to be very low. Hughes forecasted 687,000 freshmen in 1970, as contrasted with an actual first-time degree-credit enrollment of almost 1.7 million.

A familiar plea is also made: "Teachers must increasingly recognize their responsibility to teach students to think and to live, rather than merely to impart facts to them." (p. 83) The plea is still with us in the rising chorus of voices listed here.

788. Russell, John Dale (ed.). *The Outlook for Higher Education.* Proceedings of the Institute for Administrative Officers of Higher Institutions, 1939. Chicago: University of Chicago Press, 1939. 256 pp.

18 articles dealing with trends in student enrollments, financing, foundations, accreditation, institutional cooperation, etc. Includes a notable misforecast by Newton Edwards, declaring "It is clear that the period of phenomenal expression is drawing to a close." (p. 54)

789. U.S. President's Commission on Higher Education (George F. Zook, Chairman). *Higher Education for American Democracy.* Washington : USGPO, 1947.

Vol. 1. *Establishing the Goals* (103 pp.). Advocates education for a better nation, equal opportunity, general education, and education adjusted to needs.

Vol. 2. *Equalizing and Expanding Individual Opportunity* (69 pp.). Discusses the economic barrier, racial and religious discrimination. Recommends the assumption of greater responsibility for adult education and a national program of scholarships and fellowships.

Vol. 3. *Organizing Higher Education* (74 pp.). Covers facilities, state and national organizations, and voluntary agencies.

Vol. 4. *Staffing Higher Education* (63 pp.). Reviews preservice and inservice education and improving working conditions.

Vol. 5. *Financing Higher Education* (49 pp.). Focuses on the role of the federal government.

Vol. 6. *Resource Data* (51 pp.). Tables.

790. Hutchins, Robert. *The University of Utopia.* Chicago: University of Chicago Press, 1953. 103 pp.

Points out hazards to education such as industrialization, specialization, philosophical diversity, and social and political conformity. "Utopia" used as a rhetorical device: not Heaven, but simply an intelligent Western country, from which examples are provided to contrast with present practices.

791. Engelhardt, Fred. *Forecasting School Population.* New York: Columbia University, Teachers College Press, Contributions to Education, No. 171, 1925. 66 pp.

Discusses the Bell System Survey Technique and other mathematical methods for improving input forecasting.

792. Wolfle, Dael. "The Size and Quality of Future School and College Enrollments" in Joseph Spengler and Otis Dudley Duncan, *Demographic Analysis: Selected Reading.* Free Press, 1956, pp. 539–545.

793. Thompson, Ronald. *Impending Tidal Wave of Students.* Washington: American Council on Education, 1954.

B. NEW AND RELEVANT PERIODICALS

794. *The Futurist. A Journal of Forecasts, Trends and Ideas About the Future.* Washington: World Future Society (P.O. Box 19285, Twentieth Street Station, Washington 20036). $7.50 annually.

Published bi-monthly since February 1967 and improving with each issue since its original inception as "A Newsletter for Tomorrow's World." Includes a variety of short articles, book reviews, speech extracts, as well as a member's book service offering a 10% discount on a list of about 60 books, most of them worthwhile. For an additional $10 per year, the WFS Supplemental Program offers current news on who is doing or writing what, and abstracts of recently published books. Recommended.

795. *Futures. The Journal of Forecasting and Planning.* Guildford, Surrey, England: Iliffe Science and Technology Publications, Ltd. (32 High Street). $22.50 annually. (U.S. subscribers may order through Iliffe–NTP, Inc., 300 E. 42nd St., New York, N.Y. 10017.)

Published quarterly since September 1968, quite valuable but overpriced. "Contains articles and original papers on the probable and possible long-term trends in science, technology, economics, politics, and social conditions, and on the means by which desirable goals may be selected and achieved." (Journal masthead) A serious publication with an international focus. Recommended.

796. *Technological Forecasting: An International Journal.*

Published quarterly since Spring 1969 by American Elsevier Publications (52 Vanderbilt Avenue, New York, N.Y. 10017). Vol. 1: $24.00; Vol. 2 and subsequent volumes, $26.00 annually. The journal is largely concerned with methodology rather than substantive forecasts.

797. *Socio-Economic Planning Sciences*

Published in England since 1968 by Pergamon Press. (American office: Maxwell House, Fairview Park, Elmford, N.Y. 10523.) Devoted to quantitative analysis of inter-disciplinary problems, especially as concerns applications of systems analysis to the planning of public welfare and community services.

798. *Policy Sciences: An International Journal for the Policy Sciences.*

Edited by Edward S. Quade, in association with Harold D. Lasswell and Yehezkel Dror, and published quarterly since Spring 1970 by American Elsevier Publications, 52 Vanderbilt Avenue, New York, N.Y. 10017. "*Policy Sciences* will provide a forum for the developing interest in the application of structured rationality, systematic analysis, and inter-disciplinary knowledge to problems of public policy. It will include applied studies analyzing specific problem areas, theoretic studies on the methods, content, and problems of the policy sciences, and papers dealing with the policy sciences as a subject for research and teaching and as a new profession." (advt.)

799. *Social Policy* (Frank Riessman, Editor).

Published bi-monthly since May/June 1970 by International Arts and Sciences Press (901 North Broadway, White Plains, N.Y. 10603). $8.00 a year; $14.00 for 2 years; $19.00 for 3 years. Generally radical articles on education, health, welfare, and other areas of public policy.

800. *Notes on the Future of Education* (Donnelly J. Barclay, Editor).

Published quarterly since Fall 1969 by the Educational Policy Research Center at Syracuse, 1206 Harrison Street, Syracuse, N.Y. 13210. Subscriptions are free. The research from which these brief articles are drawn is conducted under a contract with the U.S. Office of Education. Especially see I:2 (articles on the quantity of instruction) and "the learning force", I:3 (special issue on methodology, with articles on macro-system forecasting, the applications and limitations of the Delphi method to education and economic models), II:1 (three policy articles prepared for the National Reading Center, which plans to coordinate a massive attack on functional illiteracy in the U.S.), and II:2 (special issue on three improbable probabilities: that we will be older, dumber, and poorer).

801. *Interchange: A Journal of Educational Studies* (Andrew Effrat, Editor).

Published quarterly since Spring 1970 by the Ontario Institute for Studies in Education, 252 Bloor Street West, Toronto 5, Ontario Canada. $5.00 per year. Especially see Vol. 1, No. 4, "Education for the Future," and Vol. 2, No. 1, "Alternatives in Education."

802. *Education and Urban Society.*

Published by Sage Publications, 275 So. Beverly Drive, Beverly Hills, Calif. ($8.00 annually), since November 1968. Subtitled: "An Independent Quarterly Journal of Social Research with Implications for Public Policy."

803. *Change: The Magazine of Higher Education.*

Published bimonthly since 1968 by Science and University Affairs (211 West 61st Street, New York, N.Y. 10023), $8.50 per year. A more lively counterpart to the *AAUP Bulletin.*

804. *The Chronicle of Higher Education.*

Published weekly during the academic year and monthly during the summer since 1966. Annual subscription is $15.00 for 38 issues (Chronicle, 1717 Mass. Ave., N.W., Washington, D.C. 20036). A very useful—indeed, essential—publication for keeping up with new books, and commission reports which are often reprinted whole or in part.

C. BIBLIOGRAPHIES (NOT ELSEWHERE CLASSIFIED)

805. Marien, Michael (comp.). ***Essential Reading for the Future of Education: A Selected and Critically Annotated Bibliography.*** Syracuse: Educational Policy Research Center, September 1970. 56 pp. Revised Edition, March 1971. 71 pp. $1.50.

A shorter version of this bibliography, with a greater emphasis on general futures literature not immediately related to education. By "creaming" the literature an introduction to educational futures is offered for new students of any age or position, while at the same time providing an overview for the very busy policy-maker. The September bibliography has 146 items plus an addendum of twelve, while the March bibliography covers 200 items. A third edition may be prepared in Fall 1971.

806. Marien, Michael (comp.). ***Alternative Futures for Mankind: An Annotated Bibliography of Societal Trends, Forecasts, and Proposals.*** Syracuse: Educational Policy Research Center, Fall 1971 (?), $5.00.

A bibliography similar to this one in its length and style of annotations, except that it will be devoted to futures literature in all categories: general overviews, science and technology, society, polity, economy, environment, learning, methodology, pre-World War II forecasts, selected utopian and science fiction writings, and pop forecasting (astrologers, psychics, "gee-whizzers"). This effort will necessarily be incomplete, but hopefully suggestive of the wide variety of major works on all aspects of the future. About 200 of the most important and/or future-oriented items in this present bibliography will be included, largely in the "Learning" section.

807. Rojas, Billy (comp.). ***Future Studies Syllabus.*** Amherst, Mass.: University of Massachusetts, School of Education, Program for the Study of the Future in Education, revised edition, 1971.

Outlines of about 70 futures courses. Also see ***Future Studies Directory*** (September 1970, 288 pp., mimeo.) which lists about 60 organizations and 100 individuals throughout the world.

808. Rojas, Billy (Comp.). *Future Studies Bibliography.* Amherst, Mass.: University of Massachusetts, School of Education, Program for the Study of the Future in Education, August 1970, Revised Edition. 125 pp. Mimeo.

A non-annotated listing of about 2000 items in 15 major categories: comprehensive previews of the future, futurist literature of the past, futurist methodology, demographic projections, political futuristics, economics futuristics, technological futuristics, new environments, biological futuristics, cities of the future, literature of the future, sources of future ideologies, education in the future, futurists and futuristics, and critical bibliographical information. About 200 items on education are listed—nearly all of which are included here: thus this bibliography should be primarily of interest to the general futurist. Copies of this valuable document are in very limited supply.

809. Mayhew, Lewis B. *The Literature of Higher Education, 1971.* San Francisco: Jossey-Bass, Spring 1971. About $7.50.

". . . reviews the outstanding works in (the) field for 1970 and offers a lengthy essay which surveys trends in the literature from 1965 to 1970. The books Mayhew reviews are classified under the following categories: governance, history, campus unrest, reflections of presidents, institutional differences, conference proceedings and symposia, teaching and other professional procedures, curriculum, and finance." (advt.)

810. Ohliger, John. *Bibliography.* Columbus, Ohio: Ohio State University, Center for Adult Education (353 Arps Hall), Fall 1970. 33 pp. Mimeo.

Prepared for an adult education seminar on "The Learning Society or the Person Learning: The Ideas of Ivan Illich and Others as They Apply to Issues of Adult Education," this extensively annotated bibliography of 95 items includes 43 items by or about Ivan Illich.

811. Summerhill Society. *A Bibliography for the Free School Movement.* N.Y.: Summerhill Society (339 Lafayette St., New York, N.Y. 10012), (1970) (?). $.50.

812. *Directory of Free Schools.* Sebastopol, Calif.: Alternatives! (1526 Gravenstein Hwy.), 1970. 32 pp. $1.00.

Lists free schools alphabetically and by state, and also contains an article on "How to Start a Free School," explaining that "A free school is an alternative institution whose purposes are twofold: First, it is a place where a group of students can obtain a meaningful education, where they can grow and develop in an atmosphere of acceptance, love and freedom . . . The second purpose is to influence the public schools. The existence of working alternative models may help to accelerate the process of social change in public school systems. The main directions of this change would include the elimination of compulsory attendance, required courses and grades."

813. *The Big Rock Candy Mountain.*

Published by Portolo Institute, Inc., 1115 Merrill St., Menlo Park, Calif. 94025. $8.00 per year (two issues plus four supplements) or $4.00 per copy. Similar in concept to the Whole Earth Catalog, devotes itself to "resources for ecstatic education": schools, teaching methods, toys and games, publications, teaching laboratories, films, tapes, records, etc.

VII. ADDENDA

A. GENERAL

(Social Change and Social Goals)

814. Marty, Martin E. *The Search for a Usable Future.* N.Y.: Harper & Row, 1969. 157 pp.

An eminent theologian reviews contemporary thinking among futurists and theologians, and argues "for an approach which retains the ambiguity of history and yet which motivates action and prevents paralysis" (p. 73)—a future with hope. "The sense of a useless past . . . is not to take a nihilist's view of historical life but rather to point to the creative possibilities of the moment." (p. 12) The volume goes on to point out how various approaches to the future of man and society affect the actions of people. Recommended.

815. Commission on Population Growth and America's Future. *Population Growth and America's Future.* Interim Report of the Commission. Washington: USGPO, 1971. 56 pp. $.40.

"This Report outlines the population situation in the United States and the issues it poses; raises questions about the probable impact of future population growth and distribution, and describes how the Commission is developing answers to these questions." (GPO brochure).

816. Markley, O. W. *Alternative futures: Contexts in Which Social Indicators Must Work.* Menlo Park: Educational Policy Research Center at Standford, Research Note EPRC 6747–11, February 1971. 16 pp.

"A 'morphological' method for projecting . . . a set of alternative future histories is presented, and interim results (which serve as such a set of contexts) described. Development of indicators relating the 'world macroproblem' to human well-being and fulfiliment are especially urged, as their use would help illuminate difficult problems that occur in all plausible future histories starting with the present. The alternative future histories are also used to illustrate how 'normative' social indicators might be of practical value." (Abstract) The five "mid-range futures" discussed are "War" on Ecosystem Imbalance, Status Quo Extended, Imprudent Optimism (leading to a left-centrist recession and bureaucratic stultification), Excessive Reprivitization (leading to a right-centrist recession and garrison state), and Violence Escalated.

817. Theobald, Robert and J. M. Scott. *TEG'S 1994: An Anticipation of the Near Future.* Chicago: Swallow, June 1971. $6.00; $2.50 paper.

818. Dorsen, Norman (ed.). *The Rights of Americans: What They Are—What They Should Be.* Essays Commemorating the 50th Anniversary of the American Civil Liberties Union. N.Y.: Pantheon, 1971. $12.95.

31 essays, including "The Right to Equal Educational Opportunity," "The Right to Publish," "The Right to Access to Mass Media," "The Rights of Juveniles," "The Rights of Teachers and Professors," "The Rights of Students," etc. This overview of all areas of the law having an effect on personal freedom may be of considerable value to educational policy makers who wish to promulgate basic American values.

(Impacts of Technology)

819. Mesthene, Emmanuel G. *Technological Change: Its Impact on Man and Society.* Harvard Studies in Technology and Society. Cambridge: Harvard University Press, 1970. 124 pp. $4.95; N.Y.: NAL Mentor Books, 1970. 127 pp. $1.25. Bib., pp. 96–124.

An overview of the ongoing research of the Harvard Program on Technology and Society, woven into three chapters on social change, values, and economic and political organization. The opening comments quickly dispose of "three inadequate views": the optimistic view of technology as an unmitigated curse, and the complacent historical view that technology is not worthy of special notice. Rather, technology is seen as outstripping traditional categories of thought, and established values and institutions, and necessary responses are suggested. The volume is concluded with a well-annotated bibliography of 70 items.

820. Baier, Kurt and Nicholas Rescher (eds.). *Values and the Future: The Impact of Technological Change on American Values.* N.Y.: The Free Press, 1969. 527 pp. Bib., pp. 472–512.

17 essays aimed "toward the discovery of ways of guiding social change in directions which are at the least not incompatible with the realization of our deepest values, and perhaps even helpful to it." (p. v) Some groundwork is laid for a new profession of "value impact forecasters," especially via methodological pieces by Rescher, Gordon, and Helmer. The other essays are largely focused on economics, and the editors readily confess the weakness of excluding views by anthropologists, sociologists, and psychologists. There are two bibliographies: the first lists 300 uncategorized items on technological progress and future-oriented studies; the second offers about 500 categorized items on theory of value.

821. Taylor, John G. *The Shape of Minds to Come.* N.Y.: Weybright and Talley, 1971. $6.95.

"Scientific developments now afoot will soon make it possible to increase our learning capabilities from birth onward, extend memory reduce aggressiveness, shorten the time neeedd for sleep, eliminate criminality, and enjoy heightened sensory pleasures. In this book John Taylor describes the chemical, surgical, electronic, and hypnotic methods that can bring a mental revolution of tremendous importance to mankind." (advt.) (Not seen, but the advertising suggests "gee whiz" forecasting.)

822. Martin, James and Aldrian R. D. Norman. *The Computerized Society: An Appraisal of the Impact of Computers on Society Over the Next 15 Years.* Englewood Cliffs: Prentice-Hall, 1970. 500 pp. $10.95.

Covers a wide range of topics, including discussion of "The Symbiotic Age," teaching with computers, a National Data Center, threats to privacy, changes in employment patterns, and protective action changes needed in education and law.

823. Miller, Arthur R. *The Assault on Privacy: Computers, Data Banks, and Dossiers.* Ann Arbor: University of Michigan Press, 1971. 333 pp. $7.95.

Yes, it *can* happen here. Miller, a law professor, provides a highly readable, chilling, and competent overview of the new technology in the information-based society and the various threats to personal privacy at present and in the future. Anyone concerned with the future should read the entire book, but educational policy-makers at all levels should consider the sections on "The Testing Game" (pp. 90–105), and, more importantly, "The Little Red Schoolhouse Goes Electronic" (pp. 105–122). The latter section is a must for anyone involved with educational technology, for it is the only array of possible negative consequences that is known to this compiler. (Indeed, mention of a single negative consequence cannot be recalled from the literature cited here.)

Miller discusses the growing practice of relying on "pseudo-psycho" test results as a crutch, pointing out that "there is ample evidence that many test developers and users display a lack of concern over the significance of the impact these tests may have on some people." (p. 92) Moreover, "tomorrow's personality inventories will be considerably more sophisticated (and intrusive) than today's." (p. 101)

The anti-privacy potential of hardware in schools and colleges may well be even more frightening. Miller covers dossiers as an "inevitable by-product of computer-assisted instruction," networking data banks "so that the details of a student's educational life history can be made immediately available throughout the education system," videotape preservation of embarrassing responses of students and teachers, the numbing effect of technology on school-age populations, infiltrating subliminal messages through instructional devices, and the possible loss of trust and consequent debilitation of the student-teacher relationship. Perhaps adequate safeguards can be developed (and Miller discusses what could be done in schools, as well as in the wider society), but, at present, "Many overzealous educators appear quite oblivious to the possibility that sensative data derived from an easily accessible and often naive student population may be used to the prejudice of the file subjects." (p. 113) Recommended.

(Manpower Requirements)

824. Schultz, Theodore W. *Investment in Human Capital: The Role of Education and of Research.* N.Y.: Free Press, March 1971. $8.75.

(Equality and Social Selection)

825. Organisation for Economic Co-operation and Development, Center for Educational Research and Innovation. *Equal Educational Opportunity: A Statement of the Problem with Special Reference to Recurrent Education.* Paris: OECD, February 1971. 47 pp. $1.50. (Available from OECD Publications Center, 1750 Pennsylvania Ave., Washington, D.C. 20006).

"First volume in a series which will analyze the various strategies available to policy-makers, leading to suggestions for new policies in the 1970s." (brochure)

(The Knowledge Explosion)

826. Ways, Max, "Don't We Know Enough To Make Better Public Policies?", *Fortune*, April 1971. pp. 64+.

This article is of fundamental importance to all students (including educators, futurists, and policy-makers), because it asks whether modern society is "in danger of rattling apart because the progress of knowledge is so uneven in its application to the world of action."

Ways quickly dismisses the "utopian view of progress-through-knowledge," and the most recent exponent of this view, Bentley Glass (item 491). "There is considerable evidence that the more we learn the more we need to know. Few scientists think they are running out of questions. And it is the common observation of nonscientists that society in action faces more 'problems' now than it did fifty years ago." (p. 66)

Forecasting business activity and the impact of government policy, despite the advances of economics, has not become easier or more successful because "The wild cards multiply even as economists raise their skill in dealing with the determinable elements." (p. 67) One of the reasons for this paradox is that contemporary society confronts new and formidable areas of ignorance, leading to "a new kind of inertia" where change is resisted because we cast about for a higher degree of certainty. "Such, however, is the inescapable context of all policymaking in a truly *complex and rapidly changing* society. Either we accept the framework of acting on the basis of very incomplete knowledge or else we condemn ourselves to retaining unchanged those institutions, like the present welfare system, for which we have lost respect." (p. 118) [Note that school system could readily be interchanged with welfare system.]

This condition is further aggravated because "Many scientists are unwilling to drop their fruitful specialized research and commit their careers to the bewidering complexities of transdisciplinary attack on the new areas of ignorance disclosed by the environmental challenge." (p. 125; or, for that matter, new areas of ignorance disclosed by the arms race, population growth, health, drugs, housing, and, of course, education.)

It is concluded that "The U.S. can and must do a better job of selecting specific lines of knowledge to be emphasized and specific lines of action on which to concentrate . . . The real complexities of our present and future call for a public temper both more humble and more resolute." (p. 128) Recommended.

827. Shapeley, Harlow, *The View from a Distant Star: Man's Future in the Universe.* N.Y.: Basic Books, 1963.

An eminent astronemer writes in popular style about man's knowledge and ignorance, considering man in the frame of the universe at large: man's place in space, time and evolution, and problems of co-existing. Shapley attacks specialism in education and even wonders whether we should abandon it, feeling that "education has become largely a superficial device for concealing the ignorance within." (p. 145) A "Plateau Curriculum" is advocated (pp. 150–154), and broader comments are addressed to a "Psychozoic Kingdom" and "The Coming World State." Also of contemporary interest is the outright debunking of astrology. (pp. 130–134)

(Global Perspectives on Education)

828. Beckwith, Burnham Putnam. *The Next 500 Years: Scientific Predictions of Major Social Trends.* Foreword by Daniel Bell. N.Y.: Exposition Press, 1967. 341 pp.

An imaginative, provocative, and comprehensive attempt to view the very long-range future. Simplistic views of education, ultimate world centralization, and scientization; but this "sleeper" volume should nevertheless be looked at for its vast array of mind-bending ideas.

829. Snow, C. P. *The State of Siege.* The John Findley Green Foundation Lecture, Westminster College, November 1968. N.Y.: Charles Sribner's Sons, 1969. 50 pp.

This mini-book provides an excellent (albeit disturbing) introduction to future-study through a consciously pessimistic overview that juxtaposes the present world-wide malaise ("We are behaving as though we were in a state of siege") with critical future problems of population growth and famine. Although serious local famines will occur, a large-scale famine will not appear before 1980—but a major catastrophe is expected before the end of the century. To avoid this population restriction and large-scale aid from the developed nations is required, but the eventuality of either is doubted. "To stint ourselves to avoid a disaster in twenty years—what body of people would ever do it? Right." (p. 38) Three scenarios are offered, along with an assessment of their porabable occurrence. Recommended.

830. Kahn, Herman and Anthony J. Wiener. *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years.* N.Y.: Macmillan, 1967. 431 pp.

A widely known and respected volume—perhaps inordinately so, considering the focus on international politics and the possibilities of nuclear war, with little or no mention of ecology, communications, transportation, education, and the global economy. Nevertheless, it is (or has been) a modern classic. Especially see the discussion of "The Basic, Long-Term Multifold Trend" (pp. 39–64), various scenarios, and the excellent final chapter on "Policy Research and Social Change."

831. Brzezinski, Zbigniew. *Between Two Ages: America's Role in the Technetronic era.* N.Y.: Viking Press, 1970. 334 pp. $7.95.

A broad perspective of global trends by a leading scholar of international relations. The U.S. is seen as the "principal global disseminator of the technetronic revolution" (p. 24) and as "a society that is both a social pioneer and a guinea pig for mankind" (p. xv). ("Technetronic" has been coined by the author to connote the pervasive influence of technology and electronics.) Under these unprecedented conditions, there is an "age of volatile belief," leading to a worldwide condition of crumbling religions and ideologies. The Soviet Union is seen as steeped in "dull social and political orthodozy," and, among five alternative paths for Soviet development (p. 164), the most probable short-term outcome is viewed as a balance between oligarchic petrifaction and technological adaptation. America is left to lead the way, despite problems with the New Left ("an essentially negative and obsolescent force"—p. 231) and doctrinaire liberals and the future is optimistically seen as a combination of more social planning, participatory pluralism, rational humanism, and a community of the developed nations.

The distinguishing feature of "The Third American Revolution" that is creating three Americas in one (technetronic, industrial, and preindustrial) is that it "simultaneously maximizes America's potential as it unmasks its obsolescence." Unfortunately, Brzezinski is overly preoccuppied with "The New Left Reaction" and "The Crisis of Liberalism" (each meriting a full chapter), while failing to seriously address the problems of American obsolescence (which are teasingly mentioned in passing throughout the volume). Despite such imbalance, this volume should be important. Recommended.

832. Ribeiro, Darcy. *The Civilizational Process.* Translated, and with a foreword by Betty J. Meggars. Washington: Smithsonian Institution Press, 1968. 201 pp. $6.50.

A global scheme of sociocultural evolution by a Brazilian anthropologist with a "third World"/Marxist viewpoint. After reviewing archaic societies, regional civilizations, and world civilizations, Universal Civilization is seen as inevitable, resulting from an expansion of the Thermonuclear Revolution. Future Societies are seen as socialist formations of a new type, with eradication of differences between city and country, art once again a universal activity, and a world of almost unlimited activities both in knowledge and in action. "Once the problems of elimination of shortages and the social regulation of abundance, and of equalization of educational opportunity and generalization of public health facilities have been solved the primary challenges confronting Future Societies will cease to be their effective use of the prodigious resources of enrgy, goods, and services. Instead, there will be new problems related to the appropriate use of the power of compulsion over men and the rational application of the socialization process." (p. 139) Recommended.

833. Fuller, R. Buckminster. *Utopia or Oblivion: The Prospects for Humanity.* N.Y.: Bantam Books, Matrix Editions, December 1969. 363 pp. $1.25.

Twelve papers based on talks or articles prepared over the past several years, providing a good overview of Fuller's thought. Especially see instrutions for The World Game, and the explanation of the 14 dominant concepts unique to Fuller's philosophy: universe, humanity, children, teleology, reform the environment (rather than man), general systems theory, industrialization, design science, world service industries, ephemeralization and invisible commonwealth, prime design initiative, self-disciplines, comprehensive coordination, and world community and sub-communities of world man. (pp. 305–342) In the Epilogue written for this book there is a good summation of Fuller's wildest ideas: two-mile high tower habitations, tetrahedronal floating cities. 10,000 passenger aircraft, domed-over cities, sky-floating geodesic spheres, and mobile habitats.

In summation, "The comprehensive introduction of automation everywhere around the earth will free man from being an automaton and will generate so fast a mastery and multiplication of energy wealth by humanity that we will be able to support all of humanity in ever greater physical and economic success anywhere around his little spaceship Earth. . . . My intuitions foresee (man's) success despite his negative inertias. This means things are going to move fast." (pp. 362–363)

834. McHale, John. *The Future of the Future*. N.Y.: George Braziller, 1969. 322 pp. $7.95.

A wide-ranging overview, aided by scores of charts and photographs, with particular emphasis on ecology, technology, and planetary resources. Chapter 1 provides a good summation of future-study in the context of a transition toward a world-man image, and Chapter 5 continues with a discussion of individual futurists and organizations studying the future (a continuing interest of McHale). The final chapter discusses various aspects of the emerging planetary society, concluding that "we must understand and cooperate on a truly global scale, or we perish." (p. 300) Recommended.

835. Peccei, Aurelio. *The Chasm Ahead*. N.Y.: Macmillan, 1969. 297 pp.

An Italian industrial manager lucidly assesses the macroproblems of our time, with particular emphasis on the growing cleavage across the Atlantic brought on by the technological gap. "The gap, in effect, is between the GM age and the IBM age." (p. 64) Although Americans criticize their education system, in world perspective it is seen as far ahead: "a solid case can be made for the claim that education supports the very underpinnings of the technological gap of the future." (p. 56) To facilitate 'Global Dimensions to Our Thinking," a New Approach called Project 69 is proposed to serve as "a multi-nationally sponsored feasibility study on systematic, long-term planning of world scope." (p. 219) Recommended.

836. Reimer, Everett. *An Essay on Alternatives in Education*. Cuernavaca, Mexico; Centro Intercultural de Documentacion (Apdo. 479), CIDOC Cuaderno No. 1005, 1970. 93 pp. To be published in *Interchange* (see Item 801), 2:1, along with six responding articles.

Reimer is a colleague of Ivan Illich (items 110–114) who thinks along similar lines. It is not clear (and probably not important) as to who has originated what idea, for, as explained in the introduction to this essay, Reimer and Illich have been conversing for almost 15 years since meeting in Puerto Rico. Paolo Freire, Paul Goodman, and others have also contributed to this body of thought.

In this comprehensive essay, Reimer views school as "the universal church of the technological society" and sees the formation of a universal international curriculum. Yet, "The conclusion is inescapable: no country in the world can afford the education its people demand in the form of schools." Even in the U.S., where the richest one-tenth of the population gets ten times as much public funds for education as the poorest one-tenth, it is estimated that an additional $80 billion would be required to fully meet educational demands. Given the growing importance of schooling benefits, it is inevitable that the rich outdistance the poor both within and between nations, unless they grow in charity faster than they grow in privilege. "Since there is no precedent for such behavior, it seems wiser to turn to the other alternative, namely, not to separate education from activities which provide for more basic needs." It is also considered essential that learning resources be allocated outside the school system (as the only means of attaining equity), and that control of these resources should be in the hands of persons seeking to learn.

Schools will not be abandoned, but are seen as only one way of organizing the resources required for learning (time, space, objects, and people). A system of lifetime educational accounts is advocated (not unlike the voucher system), in addition to four laws that would effectively disestablish the school system as an educational monopoly: a law separating school and state (similar to the first amendment to the U.S. Constitution), a law forbidding favoritism based on schooling ("Where and how one has been schooled is as irrelevant to one's capacity to do a job as race or religion"), a law requiring equal sharing of public educational resources, and an effective extension of anti-monopoly laws to the field of education.

This fundamentaly new dimension may sigificantly change the nature of our ongoing national debate over education for many years to come. Recommended.

837. *The Cooperator* (Special Issue on the Sixth Annual International Cooperation Festival), 3:1, January-February 1971. (Available from The International Cooperation Council and The Cooperators, 17819 Roscoe Boulevard, Northridge, Calif. 91324)

The ICC is a coordinating body of 72 nonprofit groups that seek to foster the emergence of a new universal man and civilization serving the well-being of all mankind. This interesting 16 page document presents summary reports from the Festival, which attended to the theme of "Education for the New Civilization." Capsules are presented on reality therapy, religious studies, planetary consciousness, intercultural heritage, and new methods such as the pontoon transitional design for curriculum change; in adition to reports from interest groups such as the Phenomenon of Man Project, Universal Link, East-West Cultural Center, International Foundation for Psychosynthesis, Unique America (promoting Black Culture), International I Ching Studies Institute, The Phoenix Institute, etc.

(Multi-Level Perspectives)

838. Roucek, Joseph S. (ed.). *The New Trends in Education*. N.Y.: Philosophical Library, October 1971. $15.00.

Twenty-six essays dealing with topics such as adult education, minority education, rural education, police training, black education, Peace Corps, open admissions, community colleges, sex education, ecology training, programed education, counseling trends, intercultural education, and education in prisons. The immense variety of this forthcoming collection suggests a trend away from considering education as only the activities of schools and colleges.

839. Golenpaul, Dan (ed.). *Information Please Almanac*, Atlas and Yearbook, 1970. 1024 pp.

Special future-oriented articles by Harry N. Rivlin, "American Education: Yesterday, Today, Tomorrow;" Henry Steele Commager, "The Crisis of the University;" Philip M. Hauser, "Population Explosion: Trends and Implications;" Wilbur J. Cohen, "A Ten-Point Program to Abolish Poverty," etc.

840. Sandow, Stuart A. *Emerging Education Policy Issues in Law: Fraud. Number One of a Series.* Syracuse: Educational Policy Research Center, Syracuse University Research Corporation, November 1970. 47 pp.

An experimental Delphi exercise conducted with a small group of attorneys and educators, based on a news event of a hypothetical case of fraud that 'had been' succesfully pursued through the courts.

The case concerns a 19-year old student who has received a high school diploma, but can only read at a seventh grade level. His lawyers argue that the school system thus failed in its obligation to provide him with the learning skills they imply he received by awarding the diploma. 80% of the respondents saw the possibility of such an issue arising and succeeding in the courts within five years.

841. Sandow, Stuart A. *Emerging Education Policy Issues in Law: Career Obsolescence and Social Security.* Number Two of a Series. Syracuse: Educational Policy Research Center, April 1971. 48 pp.

This second exploratory exercise concerns a future news event where an unemployed aerospace engineer claims that society has retired him and made him economically disabled, therefore creating eligibility for social security benefits. Of the 59 respondents (out of 183 approached), 70% felt that the event would occur before 1973 if unemployment continues to exist in highly technical areas. As a major implication resulting from this case, 70% also saw the final emergence of a continuing education system, and 85% saw the overall effect of the decision as beneficial.

The third case in this series (available in draft form in June 1971), entails a court decision declaring that the state must equally support all students attending any public or private institution of higher learning in the state. The fourth case (available July 1971) involves a State Supreme Court ruling which orders an immediate end to any curriculum currently offered which places state-supported campuses in direct competition with private colleges and universities where no real need exists.

Sandow is also contemplating the preparation of "future" moot courts, a conjecture handbook available to the law schools of the country, and a histogram of the legal precedents set in the 1960's as a forecasting base for the mid-1970's.

These explorations in legal futures, although presently at a very preliminary stage, could become one of the most fruitful areas of futures research, not only in education but in other areas of our society.

B. ELEMENTARY AND SECONDARY

(General)

842. Brown, George Isaac. *Human Teaching for Human Learning: An Introduction to Confluent Education.* N.Y.: Viking, 1971. $8.50.

"Today's schools have failed to develop our children's intellects to the fullest largely because they pay too much attention to the intellect alone, ignoring the development of the other human qualities that give learning its meaning. What we need is education for the entire person: mind plus emotions, body, and spirit. Brown shows parents and teachers how it is possible to make education deeper, more lasting, and more meaningful while still working within the present educational system. Drawing upon research by the Ford-Esalen Project in Affective Education, he demonstrates how the humanistic psychologies of Abraham Maslow and Carl Rogers can be combined with new developments in fields as diverse as modern dance, contemporary theater, group therapy, physical education, and creativity training to bring about 'confluent education'—the education of the entire person." (advt.)

843. Burgett, W. A. *We Have Failed the Schools.* N.Y.: Vantage Press, 1971(?). $4.50.

". . . shows how our communities have abdicated their responsibility regarding the schools." (advt.)

844. Center for the Environment and Man, Inc. *Designing a New System of Education.* Hartford, Conn.: CEM (250 Constitution Plaza). Undated brochure. (For further information, call or write Dr. Milton A. Young)

According to the brochure, CEM has developed a comprehensive plan that enables a community to design and implement its own unique system of education. This New System of Education (NSE) is a renewal-oriented, zero-reject system, with the individual as the nucleus rather than the transistor. Education is therefore viewed as a total life experience. "CEM will train local people and work alongside the community as its NSE evolves into the unique system that will work for that community. Once the system is functioning CEM will withdraw to an advisory and evaluative capacity."

The new system, of course, is not unlike the "open learning system" outlined in the Foreword to this bibliography; the private consultant as implementer, however, may be the important innovation in creating alternative futures for learning. The success of the CEM method is not known.

845. Channon, Gloria. *Homework: Required Reading for Teachers and Parents.* N.Y.: Outerbridge and Dienstfrey, March 1971. 128 pp. $5.95.

A seasoned teacher describes her experiences in an experimental school in East Harlem.

846. Rothman, Esther. *The Angel Inside Went Sour.* N.Y.: McKay, January 1971.

Describes the experimentation of New York's P.S. 8, the Livingston School.

847. Stretch, Bonnie Barrett, "The Rise of the 'Free School'." *Saturday Review,* June 20, 1970, pp. 76–79+.

A good survey of the variety of free schools—or new schools or community schools—their common problems, and their common ideals of freedom for youngsters and a humane education. Six sources of further information are provided. (See items 811–813)

848. Gorman, Burton W. *Secondary Education: The High School America Needs.* N.Y.: Random House, February 1971. 389 pp. $7.50.

"Presents a blueprint for restructuring [the high school] to increase student participation. Included are procedures for evaluating curricular objectives and discussion of such innovations as advanced placement classes, television teaching, teaching machines, and team teaching." (advt.)

849. Goulet, Richard R. (ed.). *Educational Change: The Reality and the Promise.* A Report on the National Seminars on Innovation, Honolulu, 1967. N.Y.: Citation Press, June 1968. 286 pp.

21 articles in five categories: Into the Future with Our Changing Schools; Education and Societal Needs; Systematic and Effective Innovation; Creative Directions for Innovation by Governments, Universities, and Industry; and State of Technology in Education and Its Further Development and Implementation.

850. Guthrie, James W. and E. Wynne. *New Models for American Education.* Englewood Cliffs: Prentice-Hall, June 1971. $7.95; $4.95 paper.

851. McCracken, Samuel. *Quackery in the Classroom.* N.Y.: Commentary Reports (165 E. 56th St.), 1970. $.75.

"A critical analysis of today's fashionable educational theorists. The Report exposes the weaknesses in the current demands for radical school reform. Includes Study Guide." (advt.)

852. Renfield, Robert. *If Teachers Were Free.* N.Y.: Delta paperback, 1971. $2.25.

"Does curriculum prevent learning? What would happen if schools really tried to individualize instruction? If we do not know what the future holds, how can we determine how our schools should prepare youngsters for that future? These and other crucial questions are examined in this important book which offers proposals that have profound, revolutionary implications not just for education, but for American society as a whole." (advt.)

853. Rickover, Admiral H. G. *Education and Freedom.* Foreword by Edward Murrow. N.Y.: Dutton, 1959. $3.50; $1.45 paper.

854. Rickover, Admiral H. G. *American Education—A National Failure: The Problem of Our Schools and What We Can Learn From England.* N.Y.: Dutton, 1963. $2.25 paper.

Concerned with the quality of American education in general and the lack of emphasis on developing the capacities of the able.

855. Sarason, Seymour B. *The Culture of the School and the Problem of Change.* Boston: Allyn and Bacon, March 1971. 246 pp. $8.95; paper $3.95.

The director of the Yale Psycho-Educational Clinic questions why changes have been so difficult to accomplish and suggests that we have been looking at trees instead of forests, at individuals instead of "ecological systems."

856. Sherriffs, Alex C. and Kenneth E. Clark. *How Relevant is Education in America Today?* Washington: American Enterprise Institute for Public Policy Research (1200 17th St.), 1971. $5.75.

Part of the Rational Debate Seminars, containing views of the two spokesmen, their rebuttals, and their discussions with a seminar of informed experts, including the press.

857. Spock, Benjamin, M.D. *Decent and Indecent: Our Personal and Political Behavior.* New York: McCall, 1969. 210 pp. $5.95.

The final section, "Education for What?" (pp. 187–210) discusses Primitive Parental Education, The Drift to Pedantry, etc.

858. Trow, William Clark. *Paths to Educational Reform.* Englewood Cliffs, N.J.: Educational Technology Publications, 1971. $7.95.

A professor emeritus of education and psychology covers present and future educational reform at all levels.

859. Wees, W. R. *Nobody Can Teach Anyone Anything.* New York: Doubleday, March 1971. $5.95.

860. U.S. Congress. House Committee on Education and Labor. General Subcommittee on Education. *Needs of Elementary and Secondary Education for the Seventies.* Hearings. Washington: USGPO, Committee Print, 1970. Part 1, pp. 1–604; Part 2, pp. 605–1130.

Hearings held in late 1969. Part 1 not seen; Part 2 contains dialogues on practically every topic between the Subcommittee members and John

Bremer, Paul Goedman, John Holt, Peter Schrag, Jerris Leonard, Sir James Pitman, John W. Macy, etc., in addition to assorted statements, letters, and supplementary materials. Also see item 247, a 982-page "compendium of policy papers."

(Curriculum)

861. Burns, Richard W. and Gary D. Brooks (eds.). *Curriculum Design in a Changing Society.* Englewood Cliffs: Educational Technology Publications (140 Sylvan Ave.), 1970. $8.95.

24 articles, including "Cultural Change and the Curriculum: 1970–2000 A.D.", "The Need for Curriculum Reform," "Student Unrest and the Curriculum," etc.

862. Terry, Mark. *Teaching for Survival: A Handbook for Environmental Education.* New York: A Friends of the Earth/Ballantine Book, January 1971. 213 pp. $1.25. paper. Bib., pp. 195–213.

A simply-written book aimed primarily at teachers and administrators, with the intention of counteracting the traditional assumptions of our educational system which have led to the destruction of our natural environment (e.g., dams are good, standard of living is based on income, etc.). Terry views all education as environment education, and goes on to describe the classroom, the school, and the district as environments, and to suggest how environmental concepts can be related to 37 different subject matter areas, e.g., driver education as an opportunity for initiating units of walker education, history as an opportunity for educating about population. A few fresh ideas here, as well as a worthwhile annotated bibliography of about 100 books and reference sources.

863. "International Education for Spaceship Earth." *New Dimensions* Booklets on the Social Studies and World Affairs, No. 4. New York: Foreign Policy Association (345 E. 46th St., New York, N.Y. 10017), 1970. 84 pp. Free.

A fascinating booklet directed to social studies teachers, based on an extensive study conducted by the FPA (see below). Discusses curriculum projects, innovations in teaching methods, resources for teachers (end of chapter citations total about 120 items, in addition to a listing of about 50 resource organizations), internationalizing the current curriculum, and developing global units for elementary and secondary schools. Especially see Chapter 2, "Educational Needs for Spaceship Earth" (pp. 8–17), which itemizes goals for international education, "not utopian in the old world-federation sense . . . not to foster a sense of world citizenship that competes with the nation-state for the individual's loyality, but to develop citizens who are capable of seeing that the nation is not the only basis of organizing to carry out the functions of society . . . learning to look at the world as a single system may be essential if we're ever going to find solutions." (pp. 10–12) Recommended.

864. Becker, James M. et. al. *An Examination of Objectives, Needs and Priorites in International Education in U.S. Secondary and Elementary Schools.* Conducted by the Foreign Policy Association for the U.S. Office of Education. Bethesda, Md.: ERIC Document Reproduction Service (NCR, 4936 Fairmount Ave.), 1969 (?). $24.60 hard copy; $2.00 microfiche (code No. ED–031–612).

(Governance)

865. Meranto, Philip. *School Politics in the Metropolis.* Columbus, Ohio: Charles E. Merrill Publishing Co., 1970. 176 pp. $2.95 paper.

"Explains why school conflict has become so prevalent and suggests the implications for future school governance in the urban north." (advt.)

866. Bowers, C. A., Doris Dyke, and Ian Housego (eds.). *Education and Social Policy: Local Control of Education.* Random House Studies in Education. N.Y.: Random House, 1970. 224 pp. $3.50 paper.

867. The Danforth Foundation and The Ford Foundation. *The School and The Democratic Environment.* N.Y.: Columbia University Press, 1970. 115 pp., paper.

Papers and other materials drawn from an April 1969 conference in Washington, D.C. including essays by Ramsay Clark, Robert Finch, Alan F. Westin, James M. Becker, etc.

868. Birmingham, John (ed.). *Our Time is Now: Notes from the High School Underground.* N.Y.: Praeger, 1970. 262 pp. $5.95.

Edited by a recent high school graduate, this volume presents a wide array of underground writings, much of it aimed at humanizing high schools.

869. Postman, Neil and Charles Weingartner. *The Soft Revolution: A Student Handbook for Turning Schools Around.* N.Y.: Delacorte, 1971. 183 pp. $4.95; $1.95 Delta paper.

"The students *are* the schools. Students have begun to realize it and to take action to make schools more responsive to their needs. When they succeed, a soft revolution has happened. The ways it can happen are presented here—in a handbook of strategies for students from 15 to 25 who want change without violence, *who want to turn high schools and colleges around* without destroying either society or themselves. The authors offer models, advice, maxims, jokes and a variety of other devices that students can use right now to hasten educational change, and they describe positive actions that students have already taken to achieve it." (advt.)

(Urban Education)

870. Eddy Elizabeth M. *Walk the White Line: A Profile of Urban Education.* Garden City: Doubleday Anchor, 1967. 187 pp. $1.25.

An educational sociologist discusses the social setting of the poor and the consequences of elementary and junior high schools for the urban child in the slum neighborhood.

871. Cuban, Larry. *To Make a Difference: Teaching in the Inner City.* N.Y.: Free Press, 1970. 261 pp.

An experienced teacher describes how things could be, largely based on two premises:

"First: Teachers, regardless of race, who combine intelligence, flexibility, creativity, and concern with a broad knowledge of their students, are involved with them, and are free from arbitrary restraints imposed by the school system, can make a difference with low-income youngsters.

"Second: The conventional role of the teacher—i.e., subject specialist teaching five classes a day, or a full day at the elementary level, with extra-curricular activity in addition to all the clerical trivia that burden teaching in an inner-city school—is both anachronistic and self-defeating." (pp. 241-242)

872. Committee for Economic Development. *Education for the Urban Disadvantaged: From Preschool to Employment,* N.Y.: CED (477 Madison Ave., New York, N.Y. 10022), March 1971. 96 pp. $1.50.

"A comprehensive review of the current state of education for disadvantaged minorities. This Statement on National Policy sets forth philosophical and operational guidelines for the successful functioning of the urban schools." (advt.)

873. McMurrin, Sterling M. (ed.). *Functional Education for Disadvantaged Youth.* Published for the Committee for Economic Development. Heath Lexington, March 1971. 128 pp. $8.50; $3.00 paper.

Four papers by Ralph W. Tyler, Garth L. Mangum, Howard A. Matthews, and Seymour L. Wolfbein exploring ways in which schools can tie education with jobs to insure productive and satisfying employment.

874. McMurrin, Sterling M. (ed.). *Resources for Urban Schools: Better Use and Balance.* Published for the Committee for Economic Development. Health Lexington, April 1971. $10.00; $3.50 paper.

Five papers suggesting sweeping reforms of taxation policy, new institutions for training teachers, an emphasis on "outputs" rather than "inputs," and innovative approaches to school design and land use.

875. McMurrin, Sterling M. (ed.). *The Conditions for Educational Equality.* Published for the Committee for Economic Development. Heath Lexington, May 1971. $10.00; $4.00 paper.

Six papers on increasing educational equality in general, and on the urban poor and the Spanish-speaking minorities of the Southwest in particular.

(Facilities and Technology)

876. U.S. Commission on Civil Rights. *Education Parks: Appraisals of Plans to Improve Educational Quality and Desegregate the Schools.* Clearinghouse Publication No. 9. Washington: USGPO, October 1967. 104 pp. $.35.

Six provocative papers by John H. Fischer, John I. Goodlad, Francis Keppel, Dan C. Lortie, Neil V. Sullivan, and Paul Davidoff, plus a briefly annotated bibliography of 16 items.

877. Doyle, Frank J. and Daniel Z. Goodwill. *An Exploration of the Future in Educational Technology.* Montreal: Bell Canada (c/o F. J. Doyle, Business Planning, Room 1105, 620 Belmont St.), January 1971. 70 pp. Free.

A Delphi study utilizing 31 Canadian and 7 American panelists, and agreeing on the following major trends: a period of steady change in education over the next 25 years, extensive development and widespread adaptation of educational technology during the late seventies and eighties, and a change in societal values toward "a society more open to innovation, more insistent upon involvement and participation, and more oriented to the individual." Specific areas examined include computerized library systems and data banks, the adoption of CAI and A–V retrieval systems, the generic types of communications systems, the future role of the teacher, and education in the home.

The study concludes with a scenario of Education 1990 involving Information Retrieval Television systems employed in most schools, Computer Assisted Instruction systems at all levels, and a reduced role of the school due to supplementation by community resources and more sophisticated communications in the home. "By 1983 a significant number of homes will be equipped with home terminals capable of utilizing IRTV, CAI, and computerized library systems. By 1988 more than half of all households will employ these services. As a result significant numbers of post-secondary students will spend more time working at home alone or in small groups by 1980. Secondary students will follow by 1983 and primary students by 2000." (p. 65)

The pervasive optimism of this report might be questioned, however. The adaptation of this technology may at best be uneven (thereby aggravating problems of equal opportunity), and the consequences may not all be positive (a consideration ignored by the panel. See item 823 for questions that the panel should have considered.). Nevertheless, this exercise is provocative. Recommended.

(Personnel)

878. U.S. Office of Education. *The Education Professions, 1969–70.* Washington: USGPO (Stock No. 1780–0722), 1970. 84 pp. $1.00.

"This report is concerned with the problem of educating students from low-income families and with the attempt to sharpen understanding of the issues involved." (GPO brochure.)

879. U.S. Department of Health, Education, and Welfare. *New Careers for the Subprofessional.* Washington: USGPO (Stock No. 1780–0714), 1970. 23 pp. $.30.

"Presents the results of a conference held in July 1969 to explore the expanding role of subprofessionals, the research and development needed to provide career ladder models and appropriate training programs, and ways to increase and improve the employment of subprofessionals in three human service fields—health, education, and welfare." (GPO brochure.)

880. Brenton, M. *What's Happened to Teacher.* N.Y.: Avon, April 1971. $.95, paper.

(Finance)

881. "Establishing the President's Commission on School Finance." Washington: The White House (Executive Order), March 3, 1970. 3 pp. (Further information from Mr. Norman Karsh, The Commission, 1016 16th St., N.W., Washington, D.C.)

Interim reports will be made as appropriate, with the final report appearing not later than March 1972. 17 issues will be studied, such as the role of each level of government, nonpublic schools, tax structures, defining equal educational opportunity, measuring outputs, improving quality and efficiency, inner city schools, enrollment and financial projections for the 1970's, and data needs.

(Miscellaneous)

882. Johnson, Henry S. and William J. Hernandez (eds.). *Educating the Mexican American.* Valley Forge, Pa.: Judson Press, 1971 (?). $6.95.

"Culturally different but not deprived, the Mexican Americans are becoming frustrated and angered by the lack of bilingual and bi-cultural programs. . . . In 34 articles, leading Mexican American educators diagnose immediate concerns and propose new research-based programs." (advt.)

C. HIGHER EDUCATION

(General)

883. Aiken, Henry David. *The Predicament of the University.* Bloomington: Indiana University Press, 1971 (?). 416 pp. $11.95.

"Large American universities in recent years have become a knowledge industry, part of a military-industrial-governmental-educational complex. In an eloquent plea to stop this trend, the author argues the case for liberal education as contrasted with narrow professional training, and urges that value as well as fact be stressed at all levels of learning." (advt.)

884. Dressel, Paul L., F. Craig Johnson, and Philip M. Marcus. *The Confidence Crisis: An Analysis of University Deparments.* San Francisco: Jossey-Bass, 1970. 268 pp. $8.75.

Analyzes internal structure and articulation with faculties, universities, and disciplines, concluding that departments are out of control.

885. Francis, Roy G. *Crumbling Walls.* Cambridge, Mass.: Schenkman Publishing Co., 1971. $4.50.

A sociologist's suggestions for solving the various problems of American higher education.

886. Furniss, W. Todd (ed.). *Higher Education for Everybody?: Issues and Implications.* Washington: American Council on Education, 1971. $7.00.

Papers commissioned for the 1970 ACE annual meeting.

887. Harcleroad, Fred F. (ed.). *Issues of the Seventies: The Future of Higher Education.* San Francisco: Jossey-Bass, 1970. 192 pp. $7.75.

Nevitt Sanford, Max Lerner, Ralph W. Tyler, etc., discuss society's concerns, student needs, and institutional response.

888. Kertesz, S. D. (ed.). *The Task of Universities in a Changing World.* South Bend, Ind.: University of Notre Dame Press, April 1971. $15.00.

889. Mayhew, Lewis B. *Colleges Today and Tomorrow.* San Francisco: Jossey-Bass, 1969. 255 pp. $7.75.

A thorough overview of the problems of higher education and various proposals for reform. The first four parts deal with The Social Context, Student Response, Institutional Reform, and Issues in Instruction. The final part (pp. 217–242) cautiously extrapolates trends in "six domains about which safe predictions are possible." In structure and organization, supra-institutional boards of control will increasingly be utilized by states, and federal cabinet rank for education should be a reality by 1980. For programs and curricula, graduate work will expand (especially in education), but no emerging pattern can be seen for undergraduate education. The student role in governance "is not likely to be greater than it presently is" because "there is little evidence that the vast maority of students want or would accept responsibility." (pp. 225–226) More deficit financing is expected, and "the most likely massive form of federal aid will be in some form of direct assistance to students." The market for college teachers is expected to remain reasonably tight through 1980. "The sixth domain is that of teaching and it is in this area that utopian thinking seems farthest from emerging reality;" that is, new technologies will still be considered experimental in 1980. Recommended.

890. Burn, Barbara B. *Higher Education in Nine Countries.* Prepared for the 1971. 400 pp. $7.95.

Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, March

"Provides an abundance of data on such matters as institutional structure, organization, and governance; student organizations; enrollment trends; and prospects for future developments. Covers France, Great Britain, Canada, Australia, West Germany, Japan, Sweden, and the U.S.S.R.

A chapter on higher education in an economically less well developed nation, India, is contributed by Philip G. Altbach. Clark Kerr contributed a chapter on evaluation of national systems of higher education." (advt.)

891. Commission on Post-Secondary Education in Ontario. Subcommittee of Presidents of Universities of Ontario. *Towards Two Thousand: Post Secondary Education For Post Industrial Ontario.* Toronto: Prentice-Hall, April 1971.

A sub-committee report to the Wright Commission (item 380).

892. Organisation for Economic Co-operation and Development. *Innovation in Higher Education: Reforms in Yugoslavia.* Report prepared by the Institute for Social Research, University of Zagreb. Paris: OECD, November 1970. 189 pp. $4.25.

(Governance)

893. American Council on Education, Special Committee on Campus Tensions. *Campus Tensions: Analysis and Recommendations.* Washington: ACE, 1970. 61 pp.

Chaired by Sol M. Linowitz, the Committee points out that campus disorders could be eased by involving all members of the academic community in decision-making, holding them accountable for their actions, and improving communications among them.

894. McConnell, T. R. *The Redistribution of Power in Higher Education: Changing Patterns of Internal Governance.* Berkeley: Center for Research and Development in Higher Education, 1971. $2.00.

895. Bander, Edward J. (ed.). *Turmoil on the Campus.* N.Y.: H. W. Wilson Co., 1971. $4.50.

"Articles on campus unrest, discussing its causes, the role of the university, black studies, the over-30 view, and law and order." (*Chronicle of Higher Education*)

896. Califano, Joseph A., Jr. *The Student Revolution: A Global Confrontation.* N.Y.: W. W. Norton, 1970. 96 pp. $1.50 paper.

An excellent and quite readable overview essay by the former Special Assistant to President Johnson. Califano traveled to ten nations, contrasting the differences between students in pre-industrial and post-industrial nations, the common elements of student unrest abroad, and the relevance to America. Although student unrest in Europe and Japan is not associated with black-white tensions, drug problems, draft threats, or the tendency of adults to see unrest in terms of an international conspiracy, Califano nevertheless sees a profound crisis of belief among the students of all post-industrial nations, and makes recommendations for a greater measure of control for students over their lives, more attention paid to students by political parties, and meeting the problem of a college degree as an increasingly necessary prerequisite "for almost any kind of employment, short of digging a ditch" (which leads to an overcrowding of major universities and a proliferation of second and third rate universities). "There is no reason why business and government (in its role as employer) should not take a look at the thousands of jobs for which they now require a college degree and establish more realistic qualifications related to the job." (p. 81) This recommendation from a non-academic is strikingly singular, in contrast to the hundreds of academics advocating higher education for all (and thus expanded demand for their services). Recommended.

897. Flacks, Richard, "Young Intelligentsia in Revolt," *Trans-action*, 7:8, June 1970, pp. 47–55. Also to appear in Rod Aya and Norman Miller (eds.) *America: System and Revolution.* N.Y.: Free Press, 1971.

An overview of the rise of the student movement in the U.S. and other industrial societies by a seasoned participant/observer. "The future of the New Left depends now on its ability to break out of its isolation and to persuade the majority of Americans that their interests depend on the dismantling of imperialism and the replacement of capitalism with a fully democratized social order." (p. 54) Possibilities of the New Left transcending its present age and class base are subsequently explored.

898. Cockburn, Alexander and Robin Blackburn (eds.). *Student Power: Problems, Diagnosis, Action.* Baltimore: Penguin Books (in association with *New Left Review*), 1969. 378 pp. $1.25.

Eleven articles by largely British student radicals, arranged in the following categories: the gathering storm, the condition of higher education, the failure of student institutions, the repressive culture, and international experience.

899. Nagel, Julian (ed.). *Student Power*. London: Merlin Press, 1969. 235 pp.

Eleven essays on movements in Italy, France, West Germany, and the U.S., and the prospects of a world cultural revolution.

900. Reid, Tim and Julyan (eds.). *Student Power and The Canadian Campus*. Toronto: Peter Martin Associates, Ltd., 1970. 226 pp. $2.95.

An assortment of documents, newspaper reports and articles on Canadian school and university disruption.

901. Lipset, Seymour Martin and G. M. Schaflander. *They'd Rather Be Left: The Past, Present, and Future of Student Activism in America*. Boston: Boston: Little, Brown & Co., May 1971. $5.95.

902. Hook, Sidney. *Academic Freedom and Academic Anarchy*. N.Y.: Cowles, 1970: Delta paperbacks, 1971. $2.45.

Analyzes the confrontations at Berkeley, Columbia, Colorado, NYU, and elsewhere, and advances the claim that when students use violence and "non-negotiable demands" to influence the system, they place all of academic freedom in jeopardy. "A much needed corrective for the flood of apologist-for-youth literature that characterized the first five post-Berkeley years." (*Saturday Review*, cited in advt.)

903. Toole, K. Ross. *The Time has Come to say the Things that Need to be Said about Campus Violence, the Tyranny of a Minority, the Crusade of the Spoiled Children, the Parental Abdication of Responsibility, and the Lack of Courage, Integrity, and Wisdom on the Part of our Educational Leaders*. N.Y.: Wm. Morrow, 1971. $4.95.

Ample annotation is obviously provided for in the title of this personal statement by a conservative professor of history at the University of Montana.

904. Geier, Woodrow A. (ed.). *Campus Unrest and the Church Related College*. Nashville: United Methodist Board of Education (P.O. Box 871), 1971. $3.00.

(General Curriculum)

905. Wilson, L. C. *Open Access Curriculum*. Boston: Allyn and Bacon, March 1971. $8.95.

906. Harvey, James. *Reforming Undergraduate Curriculum: Problems and Proposals*. Washington: ERIC Clearinghouse on Higher Education (One Dupont Circle, Suite 630), Report 4, 1971. Free.

"Reviews curricular reform problems and outlines current proposals and curricula in operation on several campuses." (*Chronicle of Higher Education*)

907. Taylor, Alastair M., "Education and the Search for Order: 'Integrated' vis-a-vis 'Integrative' Approaches to Education," *Main Currents in Modern Thought*, 27:4. March-April 1971, pp. 125–131.

Argues that educators must attack the root causes of educational deficiencies at the conceptual level, for "if the basic postulates upon which the disciplines function have already become conceptually outmoded to meet tomorrow's societal requirements, the forced integration of largely irrelevant concepts in the name of 'inter-disciplinary' linkages could actually prove counter-productive." (p. 127) Taylor forecasts that "the last third of this century, marked by an accelerating impetus towards new, universalizing levels of ideation, organization, and behavior, may well appear in perspective as a period of conceptual convergence." (p. 130) The Center for Integrative Education (12 Church St., New Rochelle, N.Y. 10805), the publisher of *Main Currents*, has been promoting this "Conceptual convergence" for several decades, apparently with little success. Taylor's forecast is therefore an important prescription for the future, but, sadly, it appears improbable as a description of what will happen.

(Disciplines and Professions)

908. Bell, Wendell and James Mau (eds.). *The Sociology of the Future*. N.Y.: Russell Sage Foundation, May 1971. $12.50.

909. Sunderland, John, "Ph.D. Programs in Policy Sciences: Who, When, Where, What, and Why?", *Policy Sciences*, 1:1970, pp. 469–482.

A rambling overview touching on a variety of considerations (in contrast to Dror's "model program"—item 514). "The development of policy sciences doctorate programs is a key element in the transition of policy sciences from a multi-disciplinary stage to an interdisciplinary stage." (p. 482) Sunderland advocates programs that are experimental and flexible, where the primary aim is the intellectual and personal development of the students. The program should attract a diverse student body, representing parameters such as hard-soft, conservative-liberal-radical, conventional-unconventional, and varying degrees of non-academic experiences. Also discusses attrition, evaluation, degree requirements, student support, curriculum, and various education-research formats.

(Graduate Education)

910. Cartter, Allen M., "Scientific Manpower for 1970–1985," *Science*, 172: April 9, 1971, pp. 132–140.

Cartter has been forecasting manpower requirements for some time, and "Since 1964, having been . . . puzzled by the academic community's unwillingness to view objectively either the present or the future, I have been a somewhat lonely voice trying to convince our university colleagues that most academic fields would have an oversupply of Ph. D.'s beginning about 1970." (p. 132) He is being listened to now.

But Cartter stresses that the current problems are not simply a temporary cutback in federal funds, but that "we have created a graduate education and research establishment in American universities that is about 30 to 50 percent larger than we shall effectively use in the 1970's and early 1980's." (p. 132) The price of this surplus is not only the direct social cost of about $50,000 per Ph.D. as well as the investment in those who did not complete the degree program, "but the human cost in unfulfilled expectations and discouragement may be even more important." (p. 138)

As steps toward a more informed manpower policy, Cartter applauds the commissions that have been formed in various professional associations, and advocates reduction of the retirement age, careful reevaluation by state bodies of the graduate programs in newer public institutions (where most of the expansion is taking place), and minimum support levels guaranteed by the federal government for the strongest 75–100 "national universities," or the 50–75 major departments in each discipline. Without such support, the most prestigious departments will continue to suffer the most. "This disastrous national policy must be reversed if the cure is not to be ten times worse than the disease." (p. 139)

Although the analysis is well-done within its chosen scope, the scope only considers traditional age-graded education and the existing hard science disciplines. Might there be a different picture if the reeducation and continuing education needs of the entire population were considered, in addition to transdisciplinary problem-solving brainpower needs in ecology, urban studies, oceanography, policy sciences, etc.? Recommended.

(Distinctive Institutional Types)

911. Jerome, Judson. *Culture Out of Anarchy: The Reconstruction of American Higher Learning*. N.Y.: Herder and Herder, 1970. 330 pp. $9.50

Discusses where most colleges are at present and shouldn't be, where a few colleges are at present and where all should be, and what all colleges should do in the "reconstruction" ahead.

In the second section entitled "Thresholds of Change," Jerome describes a variety of institutions on a continuum from "institutions of free learning (Rochdale, Bensalem, College of the Potomac) to "experiments in prescription" (Friends World College and SUNY at Old Westbury). Antioch Columbia (a branch of Antioch in the New Town of Columbia, Md.) is described as a pluralistic response to these two extremes. The final section discusses 'Tomorrow's Schools."

912. Keeton, Morris. *Models and Mavericks: A Profile of Private Liberal Arts Colleges*. Prepared for the Carnegie Commission on Higher Education. New York: McGraw-Hill, June 1971, 192 pp. $5.95.

"A descriptive and statistical profile focusing on the private independent colleges and the Protestant-controlled colleges, this book offers recommendations on how these institutions might better serve society." (advt.)

913. Thackrey, R. I. *The Future of the State University.* Urbana: University of Illinois Press, May 1971. $6.95.

914. Bowles, Frank and Frank DeCosta. *Between Two Worlds: A Profile of Negro Education.* Prepared for the Carnegie Commission on Higher Education. N.Y.: McGraw-Hill, May 1971. 340 pp. $7.95.

"More than 100 Negro colleges were founded in the U.S. after the Civil War to fill the needs of black men and women in a strictly segregated society. The new problems confronting these colleges and their hopes for the future are vividly described in five contemporary institutional profiles." (advt.)

915. "The New School of Education, University of Massachusetts." *Trend: A Journal of Educational Thought and Action,* V:3. Spring 1969. 72 pp. (Copies are possibly available for $1.00 from Cooperative School Service Center, University of Massachusetts, Amherst, Mass. 01002)

A pot-pourri of articles describing the present and proposed activities of what may, by some, be seen as "The Education School of the Future." Headed by Dean Dwight W. Allen, there are no departments, and the curriculum is not fixed. Rather, there is a fluctuating mixture of Centers and Programs, and the catalog of course offerings reads "To Be Announced."

(Facilities and Technology)

916. Doxiadis Associates, Inc. *Campus Planning in an Urban Area: A Master Plan for Rensselaer Polytechnic Institute.* N.Y.: Praeger, July 1971. $17.50.

917. Ely, Donald P. *The Most Important Number is One: The Potential of Individualized Instruction in Higher Education.* The J. Richard Street Lecture, 1970. Syracuse: Syracuse University Division of the Summer Sessions, 1970. 28 pp. $1.00.

Discusses instructional technology, student generated objectives, and professor generated objectives.

(Finance)

918. Shulman, Carol. *Financing Higher Education.* Washington: ERIC Clearinghouse on Higher Education (One Dupont Circle, Suite 630). Report 3, 1971. Free.

"Considers debates and proposals about financing higher education on the federal, state, and institutional levels." (*Chronicle of Higher Education*)

919. Commission for Independent Colleges and Universities of Pennsylvania. *Study of the Financial Condition of Independent Higher Education in the Commonwealth of Pennsylvania.* Harrisburg: CICU (607 Executive House, 101 S. Second St.), 1971.

Combining data from 68 private institutions in the state (or 90% of the possible universe), the Commission concludes that a "rapidly progressive financial deterioration has set in," threatening some institutions with total disaster. The decreased level of federal support and the depressed economic situation are only accelerating the problems created by rapid expansion, efforts to raise quality, and heavy student aid inputs. CICU advocates a strategy of retrenchment on all fronts, in addition to finding new revenue sources.

920. Falk, Charles. *Impact of Changes in Federal Science Funding Patterns on Academic Institutions.* Washington: National Science Foundation, 1971. $.75. (USGPO)

Surveys, taken in 1969 and 1970, of 104 public and private institutions that have doctoral programs in science. It was found, not surprisingly, that public institutions are somewhat better off than private instititions; for example, 28% of the private schools, as compared to 9% of the public ones, reported overall spending cutbacks in academic science in 1970.

921. Carnegie Commission on Higher Education. *The Capitol and the Campus: State Responsibility for Postsecondary Education.* N.Y.: McGraw-Hill, April 1971. 144 pp. $2.95.

Although the Commission has called for an enlarged federal role in higher education for specialized purposes, this Special Report advocates preserving and improving the state systems, with regional cooperation whenever appropriate. Some of the recommendations include a broadened scope of state responsibility, so that the whole range of post-secondary education is encompassed, providing universal access to this system, limiting the powers of governors and state regulatory agencies over higher education, establishing a special commission on institutional independence within the American Council on Education, some state support of private colleges and universities, state subsidy of tuition costs for underprivileged students, easing restrictive policies on non-resident students, and abolishing residency requirements for graduate students.

D. OTHER EDUCATING INSTITUTIONS

(Pre-School)

922. Reif, Rita, "Remember When Crib Was a Place to Sleep?", *New York Times*, April 8, 1971, p. 49.

Although only a short feature article, a fundamental consideration is raised insofar as "Alternative Futures for Learning" among toddlers. It is increasingly recognized that early learning is important, and in response to this finding, the article briefly describes a demonstration of six new cribs, corrals (playpens) and play tables made by Edcom Systems, Inc. The new concept is to build a variety of educational toys into the crib: blocks to swivel, pegs to whirl, mirrors, a fish tank, plastic beads, balls, and a tape recorder that plays 15 seconds of music that the child can stop and reactivate—therefore learning to control his environment. "The three decker hexagonal 'cognition' crib is $325 plus accessories."

Also see "A Room System for Playing, Learning and Living" (*New York Times*, December 14, 1970, p. 62) which offers the same concept for the post-playpen set. For $395, Children's Motivational Environments provides a basic system of furniture (working on a system of dowels, blocks, and panels) that can be taken apart and put together again—a room-size three-dimensional puzzle with an infinite number of solutions. Similar to the extras on the family automobile, one can also add on multi-use toys and play equipment, pillows that also serve as hand puppets, vinyl beanbag seating in the shape of animals, and printed cloth tie-on panels. "Among the sophisticated concepts projected for the future are a low-voltage electrical system, pulley arrangements made with Poppit-type beads, an air compressor with which to build wind tunnels or wind-driven instruments, a photo-optical kit that will work on the principle of breaking a light beam, a cam kit and a gear system—all of which . . . (are seen as) being used with the basic room system."

Here we can begin to see the weaning of technological man. These promises for the future are also important examples of how the children of the affluent have a genuine "head start" over the children of the poor. Finally, after a child has experienced learning systems such as this, how can he (or his parents) be content with traditional schools?

(Adult and Continuing Education)

923. Commission on Non-Traditional Study. (Press Release). N.Y.: The Commission (888 Seventh Ave., New York, N.Y. 10019), March 31, 1971. 5 pp. Mimeo.

The Commission, established by the College Entrance Examination Board and the Educational Testing Service, and chaired by Samuel B. Gould, hopes to provide a national perspective on developments such as off-campus study, credit by examination, and external degree programs, in order to stimulate more flexibility and diversity in higher education. Recommendations will be made "during the next two years."

924. Collier, Barnard Law, "Brain Power: The Case for Bio-Feedback Training," *Saturday Review*, April 10, 1971, pp. 10–13, 58.

"Alternative Futures for Learning" should rightfully consider possibilities for radically new areas of human learning. Bio-feedback training is such an area, and, for want of a better category, has been classified here under "Adult and Continuing Education."

Collier reports that "A steady flow of new scientific findings indicates that, with the aid of the teaching technique called bio-feedback training, man can learn to control willfully his body and his state of consciousness to a degree that has been traditionally dismissed in Western cultures as mere trickery . . ." (p. 10) Specifically, there are possibilities of control over the electrical activity of the brain, blood pressure, heart beat, contractions of the intestinal tract, and the emotions, with the benefits of visceral learning as an alternative to drugs, enabling healthy persons to cope better with their world, and men willing themselves into various states of consciousness. However, much of the data to date has been limited to animal experiments, and Collier warns about the propensity for exaggeration about progress in this area.

925. MacKenzie, Ossian and Edward L. Christensen (eds.). *The Changing World of Correspondence Study: International Readings*. University Park, Pa.: Pennsylvania State University Press, 1971. $12.50.

926. Schaefer, C. J. and J. J. Kaufman. *New Directions for Vocational Education*. Lexington, Mass.: D. C. Heath, February 1971. $15.00.

927. Belitsky, A. Harvey. *Private Vocational Schools and Their Students: Limited Objectives, Unlimited Opportunities*. Cambridge: Schenkman, 1969. pp. 186. $7.95.

Concludes with ten major recommendations, including more joint ventures with local school systems, greater attention to those who are miscounseled, grants for disadvantaged persons enrolling in private vocational schools, etc.

(Religious Education)

928. Greely, Andrew M., "Catholic Education: Predictions, Predilections, Hunches and Educated Guesses About the Next Ten Years," *America*, 113:16, April 17, 1965, pp. 522–528.

E. PLANNING AND PLANS

(Forecasting Methodology)

929. Armytage, W.H.G. *Yesterday's Tomorrows: A Historical Survey of Future Societies*. Toronto: University of Toronto Press, 1968. 288 pp.

"The rise of . . . 'conflict models' of prediction out of what might otherwise be regarded as a welter of futuristic fantasies is the theme of this book. It tries to show how, out of the long process of preparatory daydreams, imagined encounters, wish-fulfillments, and compensatory projections, a constructive debate about tomorrow is emerging, providing us with operational models about what tomorrow could, or should be. This debate (dialogue is perhaps the more fashionable term) is increasingly becoming part of the modern self whereby man is enabled to maintain his equilibrium." (p. x) An excellent survey not only of Utopian literature, but of modern scientific efforts. Although no attempt is made at an orderly bibliographic presentation, about 500 titles are mentioned in the notes (pp. 222–265), and several hundred additional titles are sprinkled throughout the text. Recommended. (For chronological listing of about 550 utopian writings, see Miriam Strauss Weiss, *A Lively Corpse*. Cranbury, N.J.: A. S. Barnes, 1969)

930. Stulman, Julius. *Climbing to Mankind Solutions*. N.Y.: World Institute Council (777 UN Plaza), *Fields Within Fields . . . Within Fields*, 1:3 1968. 120 pp. $1.00.

A one-man periodical promulgating globalism and the integration of knowledge. A pot-pourri of imaginative ideas, including proposals for an Executive Brain Center, Cargo City (a city within a city to enhance distribution), and Urban Distribution Satellites. The hospital of the future is advocated as a brain center rather than a bed center, and "the medical student should be goal-oriented with the attitude that everything he has been taught is to be considered already antiquated by the time he receives it." (p. 93)

"Only through a totally new method of approach such as that offered by the World Institute which maximizes man's knowledge in a constant flow, cross-catalytically across all the disciplines, breaking it down more nearly to underlying principles, and new common denominators, ultimately we believe to pulsing fields, in systems, in the 'methodology of pattern,' can he hope to cope adequately with his problems." (p. 17)

Also see an inspiring anthology edited by Stulman, *Man's Emergent Evaluation* (*Fields Within Fields . . .*, 3:1, 1970); especially "Alternate Futures and Habitability" by Willis W. Harman and "Towards a Humanistic Biology" by Abraham H. Maslow.

(Planning and Policy-Making)

931. Gross, Bertram M., "The Coming General Systems Models of Social Systems," *Human Relations*, October 1967, pp. 357–374.

An imaginative and far-ranging overview of some of the realities of worldwide change and their implications for the way we look at the world (including a brief discussion of the "Learning Force" on p. 360), the trend from economic to social accounting, the varieties of the new social accounting (micro social accounting, macro-residual social accounting, and social systems analysis), and models for general reporting on social systems. This essay may be ten years ahead of its time.

932. Gross, Bertram M. and Michael Springer (eds.), "Political Intelligence for America's Future," *The Annals of the American Academy of Political and Social Science:* 388, March 1970.

Articles on societal guidance, the uses of social knowledge and social accounts, in addition to a bibliography of 62 items on social indicators.

933. Mertins, Herman and Bertram M. Gross (eds.), "Changing Styles of Planning in Post-Industrial America," *Public Administration Review* (Special Issue), XXX:2, May/June 1971. (Single copies for non-subscribers available for $2.00 from American Society for Public Administration, 1225 Connecticut Ave., N.W., Washington, D.C. 20036)

13 articles including "Planning in an Era of Social Revolution" by Bertram M. Gross, "Educational Planning: Purposes and Power" by Stephen K. Bailey, "Models for Science Planning" by Harvey Brooks, and "Planning to Heal the Nation" by Mattie L. Humphrey. Recommended.

934. Hoos, Ida. *Systems Analysis in Social Policy: A Critical Review.* London: Institute for Economic Affairs (2 Lord North St., Westminster, S.W. 1), 1970 (?). 62 pp.

(Planning for Change in Education)

935. Organisation for Economic Co-operation and Development, Center for Educational Research and Innovation. *The Management of Innovation in Education.* Paris: OECD, February 1971. 67 pp. $1.75. (Available from OECD Publications Center, 1750 Pennsylvania Ave., Washington, D.C. 20006)

Report of a workshop held at St. John's College, Cambridge, July 1969.

(Education-Related Organizations)

936. *National Assessment of Educational Progress Newsletter.*

Published by NAEP, 201 A Huron Towers, 2222 Fuller Rd., Ann Arbor, Michigan 48105, since 1968, this free newsletter periodically reports on this fundamentally important attempt to measure what is actually known among 9, 13, 17, and 26–35 year olds. Although the knowledge and skills measured are still in the realm of traditional factual retention, and there is no attempt to relate the knowledge of the young to that of the old, this project is nevertheless an important step toward meaningful indicators of educational progress.

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Anderson and Niemi (614)—Adult education for the disadvantaged; 317 items uncategorized and unannotated.

Armytage (929)—Utopian literature; about 500 items in notes.

Baier and Rescher (820)—300 uncatgorized items on technological progress and future studies and 500 categorized items on value theory.

Berman (250)—Process-oriented education in the schools; about 600 items.

Burnett and Badger (489)—Learning climate in liberal arts colleges; about 600 items with brief annotations.

Caldwell (41)—Science, technology, and public policy; 5000 items annotated and categorized.

Coombs (109)—Educational change and planning worldwide; 75 briefly annotated items.

Ferkiss (9)—Technology, social change, and the future; about 900 items.

Ferriss (133)—Indicators of trends in education; about 250 items.

Gittell and Hollander (305)—Urban school administration and the politics of education; about 250 items.

Havelock (728)—Major works on change in education; 39 items annotated and extensively indexed.

Jantsch (665)—Technological forecasting; about 420 annotated items.

Knorr (724)—Long-range planning in higher education; about 150 items including 24 state plans and planning documents.

Kurland and Miller (731)—Change in education; 40 items selected and annotated.

Lawrence (389)—Outputs, goals, and costs of higher education; about 200 items.

Lewis (68)—Manpower planning.

Marien (805)—Essential reading for the future of education; 200 items selected and annotated.

Marien (806)—General futures literature; about 1000 annotated.

Mayhew (809)—Literature of higher education, 1965–1970; about 150 books reviewed.

Mesthene (819)—Technological change; 70 well-annotated items.

Miller and Donovan (712)—PPBS in education; about 1200 items uncategorized and unannotated.

Ohliger (810)—Adult education; 95 well-annotated items including 42 by or about Ivan Illich.

Quattlebaum (127)—Recommendations of 27 commissions and policies advocaded by 23 government bodies and 55 private organizations.

Rojas (807)—Future studies syllabus: outlines of 70 courses; future studies directory of 60 organizations and 100 individuals worldwide.

Rojas (808)—General futures literature; about 2000 items categorized but not annotated.

Spencer and Awe (528)—International education; about 4000 items.

Summerhill Society (811)—Free schools.

Terry (862)—Environmental education; 100 annotated items.

Toffler (2)—General futures literature; 359 items.

Webster (702)—International educational planning; about 8000 items categorized and indexed, but not annotated.

Weiss (929)—Utopian literature; 550 items chronologically listed.

Wilcox (542)—The black university; 100 unannotated items.

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